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SEPTEMBER, 1958

the Airman

OFFICIAL JOURNAL OF THE AIR FORCE

GOVERNMENT PUBLICATIONS
SEP 25 1958
CLEMSON

MISSION: THE MOON
page 2

1

In the Middle East . . .

TAC's Composite Air Strike Force

"The primary purpose of this force is not to fight. It is a deterrent force. If it can arrive in time, there will be no aggressive move on the part of the opposing nation."

GEN. O. P. WEYLAND
Commander, Tactical Air Command
Speech to Aviation Writer's Association
St. Louis, Mo., May 27, 1957

2

3

4

5

1. Lockheed C-130 **Hercules.** 2. Martin B-57s. 3. McDonnell RF-101 **Voodoo.** 4. Douglas B-66 **Destroyer.** 5. North American F-100D **Super Sabre.**

the Airman

OFFICIAL JOURNAL OF THE AIR FORCE

VOLUME II, NUMBER 8 SEPTEMBER 1958

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Letters to the Editor

MORE GRATITUDE

Sir: Where Else Could It Happen? *(page 45, June '58 issue,* THE AIRMAN*) served as another reminder to me of how much I owe the Air Force.*

Shortly after reenlisting in 1955, I suffered a heart attack while on leave. I lay unconscious in a civilian hospital for three weeks attended by a heart specialist and two assistants. Shortly after regaining consciousness I was transferred to a USAF hospital where I spent an additional four months.

No one could be more grateful and appreciative of the wonderful care I received. I know how much the Air Force must have spent to keep me alive. I can never repay this debt, and I realize it more each day, especially when my two daughters say to me, "Daddy, we're sure glad you're in the Air Force."

S/Sgt. Fred Schoneboom
Cincinnati, Ohio

* * *

ABOUT A LETTER

Sir: *In the June 1958 issue you published a letter from M/Sgt. John LaBonte inquiring about scholarships. The answer can be found in a pamphlet,* Scholarships and Fellowships, *published by the Department of Health, Education, and Welfare.*

M/Sgt. John Anderson
APO 953, San Francisco, Calif.

Sorry, Sergeant Anderson, but the pamphlet to which you refer is no longer in publication. It has been replaced by two newer books, *Financial Aid for College Students: Undergraduate* and *Financial Aid for College Students: Graduate.* Both are available from the Government Printing Office, Washington 25, D. C. for $1.00 each. Details on scholarships were outlined in *There's A Scholarship,* August '58 issue of THE AIRMAN.

(More Letters to the Editor on page 43)

USAF PERIODICAL 30-15

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Use of funds for printing this publication approved by the Secretary of the Air Force and the Director of the Bureau of the Budget July 5, 1956.

mission: the moon

Second down. Fingers crossed. Moon to go.

That's the score as the Earth's luminous fellow traveler in space tracks toward the perigee arc which will bring it closest to our planet—a distance of some 221,463 miles—during the three-day period, September 14, 15, 16.

Prospects that this month may witness the No. 2 try are beset by a special assortment of uncertainties which have the effect of putting all current planning on a virtually day-to-day, hour-to-hour basis, hence no prearranged advanced schedule exists. The villainously unpredictable element is the weather more so than ever, and with a vengence.

As meteorologists are quick to point out, the three favorable days for a launch coincide with the approach of the autumnal equinox, September 23. Equinoxes normally usher in bad weather. In the Caribbean area, particularly, it is associated with a marked acceleration of the hurricane season, which teed off to a quite early start this year at the beginning of August, and these berserk storms bring torrential cloudburst rains along with winds of a devastating fury which have been clocked at anywhere from 68 to 200 m.p.h. in velocity.

Of the 29 major hurricanes to ravage the United States in this century, eight have lashed Florida during the 14-15-16 mid-month period and a ninth occurred so soon before to sabotage thoroughly the possibilities of adequate preparations for any try after the storm's departure. Even excessive rains on the fringe of a hurricane which may spend its full force on some far distant target area must be considered because damp, rainy weather unfavorably affects some of the small, vital components among the more than 300,000 items which make up the Moon rocket system.

Hence on paper at least the prospects, calculated on past weather records for the state, are that astronomically favorable September days are most likely to see Cape Canaveral battened down against bad weather and griping to see Jupe Pluvius veto any No. 2 launch.

The approach of the month's three good days finds scientists and experts still standing pat on the same cautious 1-in-10 odds they were quoting for a perfect operation prior to the suspense-packed 77-second flight of the "bird" which aborted after a mid-August takeoff. Some cozy weather handicappers, noting that only once in the past 40 years has Florida escaped a major September hurricane for longer than eight years running, believe the odds should be a lot greater since one of the big storms has not ripped the state since autumn 1950. The next time optimum conditions come up are October 12-13-14.

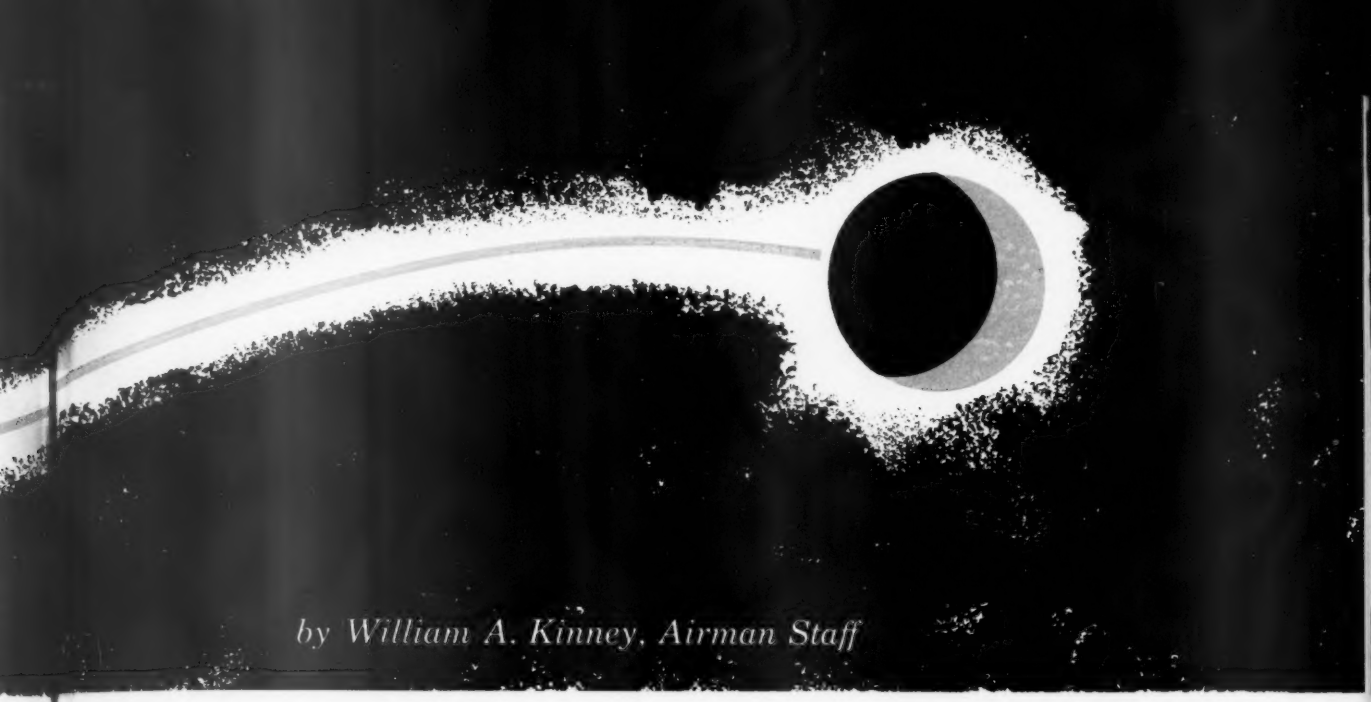
However, the second attempt to get an 80-pound probe cone out the long distance into the vicinity of the Moon is part of our cooperation in the International Geophysical Year program, hence the watching world has a big stake in the success of the project with its promise of invaluable additions to the scientific knowledge of all mankind.

1,000 M.P.H. Velocity Bonus

Now why was our Moon selected by DOD's newly created Advanced Research Project Agency (ARPA) as the first space-probe objective assigned as an IGY scientific mission jointly to the Air Force and Army?

Why not a more spectacular try at a "soft" landing on one of the two small moons of Mars where some scientists believe more favorable conditions may exist for sophisticated spacecraft of the future to take exploration parties for surface reconnaissance and then successfully return with them to Earth?

In one respect, the heart of the answer may well be said to go back untold centuries. More than any other heavenly body, the Moon has long had a unique hold on the imagination of mankind. It has been a deified symbol in the diverse religions and cults of many peoples across the world. It has enriched folklore. It has inspired immortal poetry, the greatest music, and a great deal more. When man's fertile mind first conceived the



by William A. Kinney, Airman Staff

thought of slipping a groundling's shackles to grope toward the beckoning mysteries in the vault of space above, he wrote as if by instinct of reaching for the Moon. Since the initial space-travel fiction story appeared in the second century of the Christian era, almost the best remembered soaring flights of fantasy have dealt with Moon missions.

"Quick with the TV camera, Custer! Now we'll give the critics a chance to yell even Westerns from the Moon are being forced on the public."

Drawing by Richard Decker; © 1958 The New Yorker Magazine, Inc.

From the viewpoint of this immemorial heritage, "Why the Moon?" ceases to be any question at all. Rather the query should be: Why anywhere else?

The mid-September dates are favorable for a second try from the cape launch site, scientists explain, because this period finds both Earth and Moon tilted on their axis in almost perfect coordination—an optimum condition for a probe launch. When this close coordination occurs, any time in the year, a probe rocket can be launched due east into space, rather than off at another angle. A blast off directly eastward imports to a missile the benefit of the 1,000 m.p.h. velocity of the Earth's spin in rotating on its axis.

All connected with the project are inclined to be philosophical and not regard as a jinx the short-lived 10-mile flight of the August "bird" whose failure caused sympathetic disappointment throughout the Free World.

As disclosed by ARPA Director Roy W. Johnson, four more shots are currently scheduled for the remainder of 1958. After the long-shot second attempt is fired he is more optimistic about prospects for the remaining tries, saying: "We are reasonably confident we'll make it with one or more."

Two of the remaining 1958 launches programmed are the mission of the towering 80-foot Air Force *Thor-Able* rocket system; two by the Army's *Juno,* an operational newcomer to IGY work. In all launches the mission will be to get automated probe cones in a parabolic flight path which will carry them into the pull of the Moon's gravitational field.

The program's curtain-riser launch was widely regarded as a heavily handicapped entry, so much so that Mr. Johnson himself labelled it a long-shot well in advance.

"Our people here calculated the chances for the first

time out as only about one in 10," he said.

As an example of the "iffy" factors computations for the launches have to contend with, one astronomer told me the question has arisen only this year whether the Moon is actually where we think it is. Preliminary studies of radar echoes bounced off the lunar surface and back to U. S. listening posts tend to indicate that the Moon's distance, as calibrated by optical telescopes, is somewhat greater than calculated. This preliminary evidence is currently being crosschecked by a radar study program on echoes reflected back from Venus, the major planet which passes closest (26 million miles) to both Earth and Moon. Just when the findings will be available is uncertain.

Taking the 1958 program as a whole, what are the chances of its producing at least one triumphant "mission accomplished" performance?

Here is a consensus on the possibilities for each launch as rated in an extensive sampling of opinion among scientists and other specialists.

They say it's about a 50-50 proposition that the automated final stage of a Moon rocket will achieve the scientific objective of getting in orbit around that satellite. There are a few optimists who believe a successful probe will orbit more than once; most of their colleagues seem to think a single circuit would be a sensational scientific achievement and are quite willing to settle for that as a starter. Upon completion of a single orbit, they believe the cone will have accelerated to a velocity enabling it to escape the weak lunar gravitational field and either come whipping back earthward in a sweeping parabolic track or fly off in another direction through space. For a return to our planet the completed flight path would resemble a gigantic, elongated figure 8, with the bottom loop accounting for most of the numeral's length except for the pygmy circle at the top.

The scientists see roughly one chance in four that a probe may successfully reach the immediate vicinity of the Moon but at a velocity too high for the weak gravitational field to "capture" the device in an orbital ellipse. In that event, the probe would overshoot and continue on beyond into what is called translunar space until its propellant and momentum were exhausted, eventually burning up somewhere in the vast exterior regions of the Solar System.

They also recognize roughly one chance in four that an arrival in the Moon's environment at an excessive velocity may result in a cone's impacting the lunar terrain, an accident it is earnestly hoped can be avoided because there is the keenest scientific interest in preventing the existing physical conditions on the Moon's face from being contaminated in any way. Impacting the Moon intentionally would have scant scientific or other value, despite the highly vocal campaign of alleged "authorities" who favor trying to put a marker on its face as a propaganda feat.

"The odds against putting any kind of a visible marking on the Moon's surface, utilizing currently available rocketry systems, are so formidably long that the suggestion approaches the ridiculous," I was told by the Rev. Francis J. Heyden, Director of Georgetown University's Astronomical Observatory, the Nation's oldest in active operation. "As any scientist who has studied this satellite well knows, the dimensions of the mark would have to be larger than a football stadium to be observable by a telescope and there is an oddly peculiar lunar phenomenon,

Interplanetary Weight Chart

IF YOUR EARTH WEIGHT IS—	YOUR MOON WEIGHT WOULD BE—
70 lb.	11 lb.
80 lb	13 lb
90 lb.	14 lb.
100 lb.	16 lb.
110 lb.	18 lb.
120 lb.	19 lb.

WANT TO REDUCE? The Moon is heaven for those with overweight problems. Due to its much lower gravity, objects there weigh not quite one-sixth of what they do on our planet. A 210-pound heavyweight, stepping from a spacecraft onto a set of lunar scales would tip the beam up there at about a boyish 65 pounds. Objects thrown travel six times the distance they do here and even farther if impelled with any force. If there ever is a Lunar Country Club it will be a duffer's delight. Even an anemic drive would be good for about a mile.

GUIDED NEW AF MOON STUDY: Smiling scientist in fatigues (left) is the Rev. Francis J. Heyden, S. J., Director of Georgetown University's Astronomical Observatory which has just completed for ARDC an up-to-date study of the physical characteristics of the Moon and the major planets in the Solar System. Here Dr. Heyden is shown on location atop a hill near Wu-k'ang, China, then not Red dominated, preparing for photographing observations of a total eclipse of the Sun exactly 10 years ago. His was one of the multiple expeditions in an ambitious operation which had major Air Force support. Others at the site are Lt. N. J. Fay (center), Army Engineers, and J. P. Grady, civilian camera expert from Virginia.

© National Geographic Society

among other things, which might well prevent our seeing a color or warhead burst of sufficiently large proportions even though we had the world's most powerful telescope trained on the impact zone at the time."

Geography Favors U. S. Try

From the standpoint of the modern rocketry art, the reasons for undertaking the lunar-probe program are not so readily summarized under the twin headings which seem to motivate would-be Moon mission volunteers. Airmen are ready to go for the simple reasons of because-it's-there and because it always has fascinated earthlings.

The immediately obvious reason for a priority lunar-probe program is that the Moon is the nearest significant heavenly body to our planet in the solar system and hence should present the least difficult of astronautic problems for a successful operation. Moreover, because of its proximity it stands challengingly first in inviting investigation by man.

Successful completion of a lunar probe will be dramatic proof of the cracking of some pretty tough nuts in research and development. One is the matter of engineering a lunar rocket with an escape velocity in the order of 25,000 m.p.h. to clear—but at not too fast a clip—the last vestiges of the Earth's gravitational field then enter the Moon's gravitational field with a speed nicely gauged to yield the probe to the influence of that field.

It is a question of contriving and mating a computer and guidance system which will function with flawless perfection, for only such a wholly mechanical performance can get the rocket with precision into the desired circumlunar investigation area about 2,000 miles above its surface.

If the finely adjusted propellant control is not achieved, an overshoot or impact results.

Because of the character of the Moon's orbit, the nearer a launch site is to the Earth's geographical equator the better chances are for plotting a parabolic trajectory with prospects of success. This favorable factor prevails for locations 27 degrees North or South, although diminishing somewhat with each added degree of difference. Florida's Cape Canaveral is just over 27 degrees North, but that is not considered greatly complicating the planning problem there.

One civilian expert, commenting on past European intelligence reports of a number of unsuccessful Soviet attempts since last November to get probe devices near the Moon, observed that of their known test bases none is closer than more than a dozen degrees to the 27-degree line because the country's frontiers do not extend that far south.

As a matter of fact, the only Communist dominated area in the most favorable zone is a limited area of southeast China's mainland and Viet-Nam, the latter's southern boundary being along the 17th parallel.

A lunar-probe launch from Canaveral requires a control system enabling it to leave the Earth's environment at 24,900 m.p.h., or a hundred miles less than full escape velocity. Starting from the vicinity of our planet at this speed, the device may be expected to reach the Moon's orbit some 116 hours later, or a few hours short of five days, whereas a higher velocity of, say, 27,000 m.p.h. would cut the transit time to a mere 19 hours and probably result in an overshoot.

The full escape velocity of 25,000 m.p.h., it was explained, would not blast a rocket clear of the Earth's gravitational field if the missile was aimed in any direction, other than toward the Moon. So launched, however, a velocity in that order would bring the probe cone to a zone approximately 200,000 miles out in space where the Moon's gravitational field is believed to become stronger than the Earth's and would pull the cone in the direction of its surface.

It is estimated a Moon rocket requires about five minutes to accelerate from an 18,000 m.p.h. orbital velocity thrust to the 24,900 m.p.h. which starts it easing out of the Earth's gravitational field on a lunar trajectory. As the automated probe courses through its parabolic path its velocity will be gradually diminishing although it will still be putting more distance between itself and the Earth at much less speed. A successful probe coasts much of the final many thousands of miles at a relatively very slow rate, arriving in the 200,000-mile altitude area with barely enough momentum to reach an area in the Moon's vicinity high on the slope of the Earth's figurate gravitational "pit."

Acceleration resumes, however, as soon as lunar gravitational pull starts tugging on the probe cone and, if not countered, can impart velocities in the order of 5,300 m.p.h. to a device reaching its field almost drifting. Thus such a probe would be dragged down to fall crashing on the face of the Moon some 24,000 miles below.

THE BRAND OF CATASTROPHES? Scientists debate whether the spoke-like system of rays extending big distances from some lunar craters are evidence of bygone catastrophic events, meteoritic or possibly volcanic in origin. One theory is the rays are due to cracks filled with some whiteish substance which oozed up from the hot interior, then solidified. Another version holds that the material is still pasty in consistency. A third notion sees them as surface stains made by vapors from terrain fissures too narrow to be visible. There is a fourth view that they are beams of fine powder thrown out from the craters by volcanic action. No thoroughly acceptable explanation for the rays yet exists. The cover photo shows an extensive view of the ray system.

LTO. The extent of the coming Lunar Theatre of Operations is shown by this sketch of the Moon superimposed on a ZI map drawn to the same scale. The total lunar surface area has been estimated at 1/14 that of the Earth's, the latter being almost 197 million square miles. Since only 59% of the Moon's face is visible to man, the surface area he can see is a bit under the 8,300,000 square miles which represents the extent of the entire North American Continent. In diameter, the Moon is roughly 300 miles less than the greatest estimated north-south distances in Europe.

CELESTIAL SHOOTING GALLERY TARGET: A massive meteoritic bombardment from surrounding space hammers the Moon continuously at the rate of more than a million highly explosive impacts daily. This accounts for the deeply pitted, beat-up character of its face. A number of meteoritic projectiles, all hitting with a 54,000 m.p.h. velocity, have blasted out craters of 100 miles and more in diameter. Big scientific riddle is why, in view of negligible lunar atmosphere, not one single explosive impact on dust-silted lunar terrain has ever been visually observed or photographed in over three-and-a-half centuries of intensive study? Astronomers say if huge explosions resulting from giant meteorites are not visible to trained observers or most powerful telescopic cameras due to some weird phenomenon then how do vociferous advocates of a nuclear warhead impact expect its puny payload to produce an easily seen show for naked eye watchers?

As soon as this lunar gravitational acceleration begins, the critical moment for the device's instrumentation is at hand. It must deliver in two ways to perfection. First, is a check as to the accuracy of the rockethead's position and heading with respect to the Moon, as well as velocity. The second is the firing of retro-rockets to correct position and heading, if necessary, and also to give it a speed adequately below that of lunar escape velocity which is at the surface 1.48 m.p.s. or 5,328 m.p.h. This operation has to be brought off successfully before the probe reaches an altitude in the neighborhood of 2,000 miles or more above the Moon. The device's velocity would then put it in a circumlunar orbit.

The point at which the orbiting began would be the low point of the ellipse. Because of the physical laws governing the motion of orbiting objects, natural or artificial, there would be a deceleration of the device's velocity as it reached the arc where it was the greatest distance from the Moon's surface. On the swing back to the low altitude point velocity would be accelerated. It is theorized, however, that the first probe to make an orbit would have been accelerated enough in completing a single swing to a velocity equal to escape and whirl off from the ellipse into space again. Some have theorized that a velocity of 4,000 m.p.h. would be adequate.

The probe would then either move along a parabolic path at comparatively moderate speed until it reentered the Earth's gravitational field, or else it would fly off into space in another direction. Since an Earthbound cone would lack orbital velocity then gravity would accelerate its descent rapidly through the atmosphere toward the surface, still on a parabolic course. Friction generated by transit through the increasingly dense molecular structure of our atmosphere would heat the skin of the probe device to temperatures up to 18,000 degrees Fahrenheit, hence the return of a completed mission probe would be visible for it would be glowing brightly as in triumph.

In the approach to the Moon, a probe with a velocity in excess of 5,300 m.p.h. would either overshoot or impact.

The job inertial guidance mechanisms takes on can best be understood by remembering that the launch pad from which the rocket is aimed moonward is moving with the Earth's average orbital speed around the Sun of 18.5 m.p.s. To that motion is added a second—about .293 m.p.s. which is the rotational speed of the Earth on its axis. Finally a third motion factor, Moon has its own orbital velocity, averaging 0.63 m.p.s. The parabolic flight path must be precise to a "T" because a small percentage error at the surface could put the probe far out in nowhere with relation to the Moon. Speaking of the job guidance systems must meet, one noted scientist stressed: "We have by no means reached the stage where this is simply a matter of technological child's play. Let a single gyroscope, gimbal, or other component fail to deliver 100 percent every minute and its failure of a mission. Always remember man is not a perfect creature and therefore any systems he contrives cannot be depended upon to function infallibly with peak perfection all of the time."

Other experts also pointed out that the long-shot first launches will be depending on operationally untested in-

strumentation for the finest split second performance in firing retro-rockets at the right instant to give the device the correct fix in position and heading and adjust its speed to the ideal velocity. "We are counting on mechanisms that theoretically should operate, but we have no practical experience to go on as to how performance may be under flight conditions at such remote altitudes beyond our planet," one said. "We must wait to see how it goes."

He pointed out that when the vicinity of the Moon is reached, a probe can no longer respond instantaneously to radio signal control from our planet. Radio signals travel at the rate of 186,000 m.p.s. but a probe cone moving in lunar environment some 230,000 miles distant from Earth might travel many miles in the few seconds it would take to obtain a final fix and send a return radio impulse from Earth to trigger a given instrument and those miles conceivably might be enough to spoil the show.

The flight planner's task has been likened to that of a huntsman trying to wing running small game in a distant field while firing from a speeding racing car. In plain, unscientific language, the execution of a completely successful lunar-probe operation is almost—but not quite—as simple as that imaginary feat would be.

Misty Bay Favored

For the first "soft" landings later in the program by automated probes, which ARPA Director Johnson of DOD has announced as the next phase, and for still later ones by manned missions, Dr. Wernher Von Braun has nominated Sinus Roris—Latin for Bay of Mist. Since probes will carry TV scanning instruments to record relatively close-in details on the character of the Moon's surface, it is likely that this region will receive thorough automated reconnaissance.

The area lies between the lunar latitude of from 40 to 50 degrees North and, far from being a body of water, is a smooth plain.

Von Braun's choice of Misty Bay—a romantic, idyllic sounding name—takes into consideration that the temperature there may be expected to be more tolerable for exploratory work. Just as the angle at which the Sun's rays strike the surface of our planet determine the three mean climate zones, so, too, does it create areas of varying temperatures on the Moon.

Even at Misty Bay the first lunar explorers will find surface work plenty uncomfortable, being alternately thrown from the frying pan of the two-weeks-long day into the deepfreeze of the satellite's equally long night.

"But they will easily be able to provide for themselves in underground shelters," reports Georgetown University's Astronomical Observatory in a special study, *The Known Physical Characteristics of the Moon and the Planets,* just completed for the use of ARDC (ARDC-TR-58-41).

"Inside such underground installations," the study states, "the temperature is expected to be just about the same as in the deep caves under the surface of our Earth.

"Such underground shelters must, of course, be supplied with oxygen," the report continues, "but it will not be necessary to bring this commodity from the Earth. The chemical compounds of many rocks contain lots of oxygen which can be liberated, given enough power. The power used to run the Moon-base will be atomic power since that is the most compact type of fuel that can be sent in rocket ships from the homeland. On the other hand,

GOING AROUND IN CIRCLES. Man started to do that by putting artificial satellites in orbit around our Earth (right). Next he started to compute flight paths for a mission which would reach the Moon, circuit it once, then return to Earth's near space, there to be incinerated by atmospheric friction while orbiting (center). Then he conceived the more ambitious aim of a probe cone with the capability of multiple spins about the Moon before whipping back for cremation in a circumterrestrial orbit. Lower panel diagrams parabolic trajectory to be traversed by a successful one-circuit mission whose cone survives reentry and reaches the surface again. Figures indicate estimated position of cone device for hypothetical flight of approximately five days flight in terms of hours. *Photo courtesy N.A.C.A.*

hydrogen is probably completely unavailable on the Moon, so that water and liquid hydrogen for further rocket flight will have to be brought from the Earth and stored in underground tanks."

Elsewhere, discussing the possibility that water might exist on the Moon's dark side in solid state as ice, the study points out that this unseen face also receives sunlight. During such time the ice could rapidly melt and evaporate, the water vapor easily escaping the lunar environment because of the lack of sufficient gravitation to keep it captured near the surface as is the case with the various vapors and gasses in our dense atmosphere.

Besides Sinus Roris, the Mare Imbrium—Sea of Showers—has received consideration as a target area for "soft" landings. Located in the lunar latitudes comparable to those of our temperate zones, Mare Imbrium is the largest of the Moon's great plains and can be easily picked out with glasses of any magnification. Temperature conditions there would be largely similar to those at the site Von Braun has provisionally selected.

Televising the Moon

The final stage probe cone for the 1958 phase of the program weighs some 80 pounds, or more than double the final weight of *Explorer IV*. Resembling a king-sized toy top in shape, its chief equipment consists of what is called a "visual scanning device," but might more aptly be described as a primitive television; and instruments to measure magnetism, whether encountered in transit moonward or detected in the environment there.

The TV-from-space gadget is the Navy's contribution to the first attempts to investigate the long celebrated Goddess of the Night. The camera was developed at the Naval Test Center, Inyorken, Calif.

"It's not what you'd call a good TV picture," says DOD's ARPA Director Johnson. "It's very crude, but you can make things out. I was able to make out a man in one picture and a house in another without being told what I was looking at."

So the day may well be near at hand when man can hope to learn something which for long centuries has tantalized his curiosity: What does it look like on the dark side of the Moon which has always kept its face hidden from earthlings. Astronomers, of course, have a keen professional interest in what such photographs will eventually show, and there are some differences of opinion as to whether its appearance is pretty much the same as the bright face we can see. However, their interest is also keen about the seeming promise of close-up photo coverage of the visible terrain features they have studied and photographed through their telescopes.

Science looks hopefully to successful probes also to develop precise information on the strength of the Moon's gravitational field and whether that planet possesses a magnetic field of its own. Such a field would be evidence that Earth's satellite has a mass of iron for its core. Other data scientists expect the probes to develop would enable them to arrive at more accurate conclusions on the Moon's weight and mass.

Astronomers, meanwhile, are awaiting a decision on the possible use of probe cones equipped to release self-inflating balloons of aluminum foil with an extremely high reflecting capacity to remain in lunar orbits indefinitely. These, it is believed, could be tracked by some of our planet's wide-angle lens telescopes like the 48-inch "Big Schmidt" at Palomar Observatory.

Expect several test launches of Moon-mission systems before the real thing. And keep your fingers crossed when "real thing" launch blasts off.

LUNAR RUNDOWN

Diameter: 2,162 miles, or about 36 percent of the Earth.

Mean distance from Earth: 239,100 miles.

Mean orbital velocity: 2,287 m.p.h. vs. 66,600 m.p.h. for the Earth.

Time required to circuit Earth: About 27 and 1/3 days, or one lunar month.

Composition: Probably solid rock with a thin layer of dust covering, tougher outer crust than the Earth's.

True Color: Mostly greyish.

Temperature range: From 214 degrees Fahrenheit (Sun at zenith) to 240 below zero F. (night). The lowest reading recorded on Earth is —102 degrees in the Antarctic.

Atmosphere: Negligible.

Total surface area: 1/14 that of the Earth, but only 59 percent of surface ever visible under ideal conditions.

Lunar day: 29 Earth days, 12 hours, 44 minutes, 2 seconds —one-half darkness, one-half light.

Total volume: 1/49 that of Earth.

Total weight: 1/83 that of Earth.

Surface gravity: 1/6 that of Earth.

Lunar escape velocity: 1.48 m.p.s. as compared with about 6.96 m.p.s. from Earth.

Possibilities of life: None in the animal or vegetable order as far as the present human concept of what life is.

Eccentricity of orbit: 0.055 degrees as against 0.0167 degrees for the Earth.

Inclination to the ecliptic: 5 degrees 9 minutes as against zero degrees and minutes for the Earth.

Inclination of equator to orbit plane: 6.5 degrees compared with the Earth's 23.5 degrees.

MILLION MILE MISSION

To paraphrase childhood's saying, a fairly longish way 'round is the shortest way to home on the Moon.

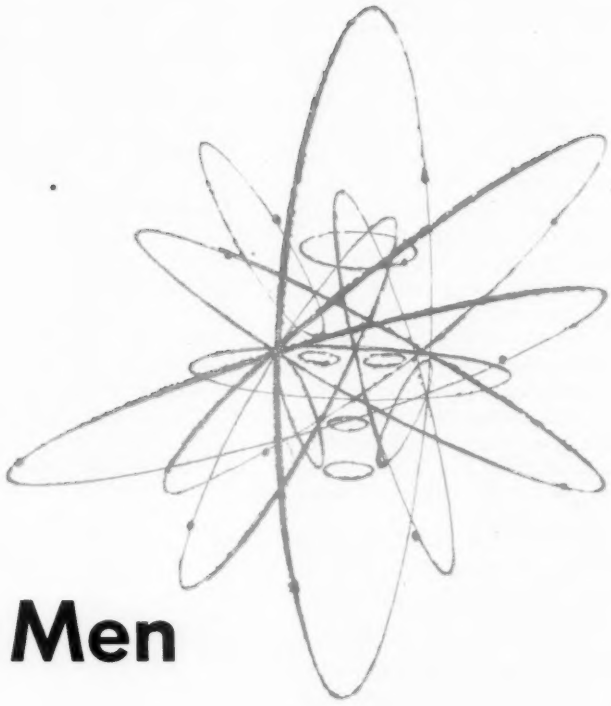
References to the distances between the Earth and the Moon are commonly expressed in terms of line-of-sight mileage, the one most frequently used being the round figure of 240,000 miles which represents the Moon's mean distance from our planet.

A probe launched to reach the Moon's environment at mean distance would have to travel a parabolic trajectory of at least twice the line-of-sight mileage to attain its operational area. The physical laws governing celestial motion control the curving course.

The simplest and shortest flight plan for a mean distance lunar probe would involve an outbound trajectory in the order of 580,000 miles. If the device succeeded in orbiting the Moon once and then escaped the gravitational field there to hurtle back Earthward, the flight would have logged well over a million miles by the time it reentered our atmosphere.

Other flight plans which may be tried would call for many times greater mileages. One such would be to put the probe first in a spiral-series ellipse about the Earth, with the device programmed to widen its looping orbit in successive passes until it had swung into the far altitude and could be "captured" in the lunar gravitation field to circuit the Moon several times before being whipped back to Earth.

Maintaining quality Air Force equipment takes able men with quality training. That's where the Air Training Command steps in.



To Train the Able Men

by 2d Lt. David Y. Burkett, Hq, ATC

OVER Thule, Greenland, a big transport plane is in trouble. While the flight engineer shuts down the sick engine and brings the propeller to attention, a calm-voiced GCA controller talks the pilot down through the soup to a no-sweat landing.

Simultaneously, in other parts of the USAF world, other things happen.

Seven miles high over Pittsburgh, a staff sergeant, lying on his belly in the tail of a KC-135 jet tanker, dumps 40,000 pounds of jet fuel into a SAC B-52 *Stratofortress* 30 feet under his nose.

In Japan, an airman yanks the chocks from an F-100 *Supersabre* and watches it scramble skyward on what he hopes is a false alarm.

In a forest clearing in Germany, a launch crew countsdown a *Matador* missile to the button-pushing point.

At Keesler AFB, Miss., a student radioman leaves his typing class and reluctantly trudges toward the parade ground for an afternoon of basic training. And at Lackland AFB, Tex., a barber impassively reduces a wavy haired teen-ager to onionlike baldness.

These seemingly unrelated incidents are obviously just a sample of typical Air Force day-to-day activities—850,000 men and women doing a thousand jobs in as many places, and they have something in common besides their blue uniform. The odds are better than 800,000 to 1 that you, like these people, have completed one or more courses conducted by the Air Training Command, one of the world's largest educational systems.

Eighty-five percent of our 850,000 are enlisted personnel, *most* of whom entered through the "Gateway to the Air Force" at Lackland AFB, near San Antonio, Tex. The basic training that transformed them from civilians to members of an efficient military team started there. Most of the officers had flight training or some other type of specialized skill imparted to them at one of ATC's 25 bases.

At these 25 bases specially trained instructors teach more than 600 courses from accounting and basic military matters to supply and utilities maintenance. Their job it to turn out the right number of people qualified in the right skills at the right time. From the start of the Korean conflict until 1957, ATC schools had graduated more than two-and-a-half-million men. In 1957, over 135,000 airmen were graduated from technical schools alone. Another 21,000 officers finished flying training courses, and an additional 19,000 airmen were trained into combat-ready aircrews.

But despite these impressive figures, the keynote in Air Training Command—as it is throughout the Air Force—is *quality,* whether the trainee is to be a clerk typist or missile guidance supervisor. The advent of missiles—with their bodies full of intricate "plumbing" and complex "gadgets" — has reemphasized the need for top quality training. Missiles fly only once and they have to do it right the first time. This means that the effectiveness and efficiency of a missile weapon system is directly pro-

Rapcon Training (Radar Approach Control) is taught at Keesler AFB, Miss., with students shown using the training equipment for this specialty. This is among the 70 courses presently being taught at the ATC base.

portional to the quality of maintenance that goes into it. ATC trains the men who perform this maintenance.

ATC's mission is basic. It recruits personnel. The goal here is to get the best people possible—particularly those best qualified in science, mathematics, and reading comprehension. Modern scientific equipment and the Air Force's responsibilities demand top quality people.

Then, ATC provides basic military and technical training, specialized technical training, and field training in advanced and specialized skill areas, officer schooling (excluding ROTC and Air Force Academy), preflight training of officers and cadets, flying training leading to aeronautical ratings, and advanced flying training for rated personnel.

While missiles have brought about radical and dramatic changes in ATC's training programs, other new weapon systems have had their effects also. Every scientific and technological breakthrough in Air Force equipment demands a readjustment within the training program.

A change in electronic fire-control systems is a good example. One of the first operational jets, the F-80B, had seven electronic technicians assigned to each squadron to maintain the fire-control system. It took 10 weeks to train these technicians. Today, an F-102 squadron demands 59 such technicians and each man needs 44 weeks of training on the system which is complicated by 4,000 vacuum tubes and 90 black boxes. Without the black boxes—sealed, delicately matched, factory built, and factory repairable, plug-in type units—the necessary training would be infinitely longer.

Advances in electronics enable a single air vehicle to accomplish more functions with more accuracy, but more men possessing greater mainenance skills are needed to keep it operating properly. Such advances are a constant challenge to Air Training Command instructors.

When the classroom doors to Space Age missile training were opened, ATC had developed new training philosophies, new courses, and new management concepts, as well as physical facilities. From these classrooms come the able men who will operate such weapon systems as the *Bomarc, Atlas, Titan, Thor, Snark, Goose,* and *GAR* series.

Prime Bases

An important development is the "prime base" concept. At these prime bases, the major portion of the technical training for a particular missile weapon system takes place. But to prevent duplication and to make best use of all Training Command resources available, some training is done at other ATC "support bases."

Sheppard AFB is an example of a "prime training base." Weapon systems taught at Sheppard include the *Atlas, Titan,* and *Thor*. At this base near Wichita Falls, Tex., men learn what they need to know about the airframes, airborne guidance equipment, equipment cooling, and electrical power generation for the "beasts." At Chanute in Illinois, courses are taught in propulsion systems and propellant handling. At Keesler in Mississippi,

Students at Air Intelligence School, Lowry AFB, concentrate on a problem.

S/Sgt. Vern L. Owens describes wing structure on Martin TM-61 *Matador*.

courses are given in ground-guidance systems. And at Lowry near Denver, men learn about warheads and nose cones. These are "support bases" for the *Atlas, Titan,* and *Thor* because they already teach similar courses relating to conventional aircraft. This saves time and money in classroom and training aid construction, and in dozens of other necessary items.

Besides conducting its own training, the "prime base" acts as "training manager" for the weapon system that has been assigned, overseeing all of the training that goes on at these "support bases," and making certain there is adequate coverage of every necessary phase. This follows a pattern set by ARDC in the intial research and development of a weapon system.

Present and planned "prime training bases" other than Sheppard, include Amarillo for the *GAM-72* and the *Snark;* and Lowry for the *GAR* series, the *Matador* and the *Mace.* ATC is currently conducting or programming courses on 14 separate missile weapon systems.

But while time and money are saved through the use of "support bases," missile training is still tremendously costly. Certain specialized training facilities such as simulation equipment that function just as the missile would on a given signal, are essential. Other training aids are extracted components of the missile itself. Maintenance and check-out areas duplicate actual operating requirements and they might include such things as special launch pads and static test stands.

But the most important single item is manpower, fully qualified instructors, and high-aptitude, career-minded students.

ATC's missile training program is divided into three phases. Phase one is special training conducted by the contractors right in the factories where the missile is built. The men who will become ATC instructors and a nucleus of the men who will man the first operational units are trained during this phase.

Air Training Command takes over with phase two of the special training to complete the military instructor staff and the remainder of the initial manpower needed for the first operational units.

Phase three brings instruction on the missile into the ATC basic technical courses where officers and airmen work toward a semi-skilled level of proficiency in their new specialty. This phase provides a constant flow of trained personnel for missile squadrons.

Most of the courses now set up for missilemen are geared to individuals who have already had field experience in certain specialties such as electronics or propulsion systems similar to those used in missiles. Later, these courses will be redesigned for students with less previous experience and less formal training. Students in these later courses will be fresh from the basic military course at Lackland.

After this individual training, the men who will launch certain of the long-range missiles will require additional crew training. The countdown is an involved procedure that demands the utmost in coordination from every team member, so teamwork is essential. This crew training is conducted by the command that will use the missile and is usually done right at the launch site. In certain cases, when requested to do so by the using command and approved by Headquarters, USAF, ATC might also conduct this phase of the training.

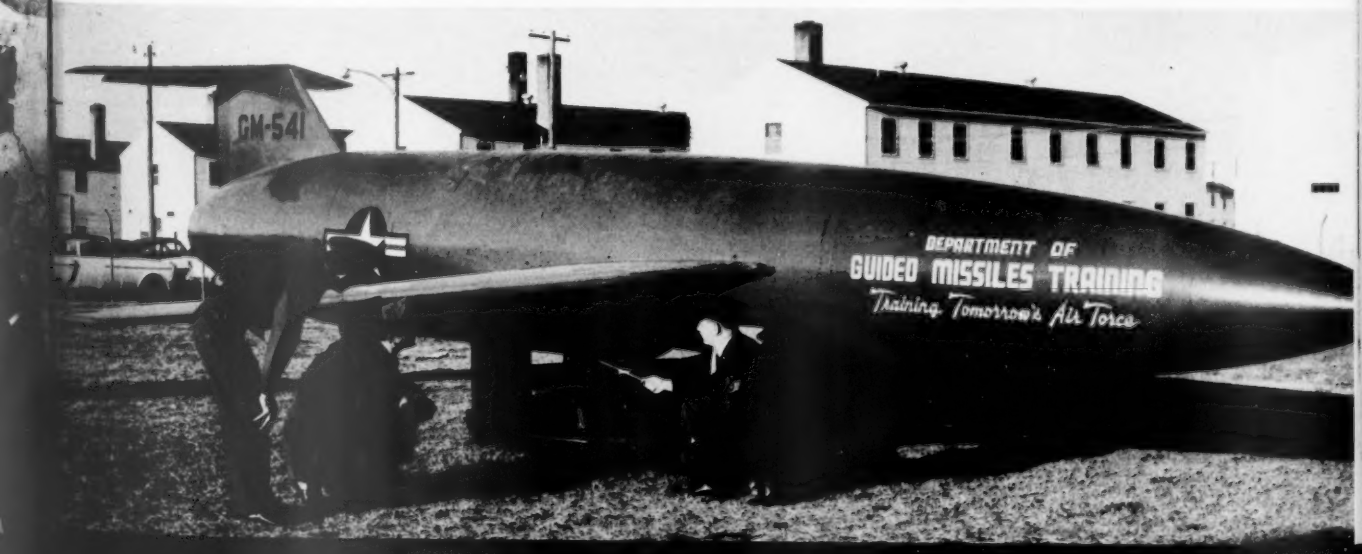
While missiles, research satellites, and the ever increasing complexity of manned aircraft weapon systems are dramatic factors that constantly change the face of Air Training Command, its goal—a better product—remains unchanged.

Road to Ability

Today's new recruit gets his first taste of military life at Lackland AFB. He learns the fundamentals of leadership, discipline, and tradition. Concurrently, numerous tests and interviews determine his capabilities and the right man is matched with Air Force requirements and sent to the right job.

At the end of four weeks most of those qualified enter one of ATC's technical schools and continue their basic training on a part-time basis. These airmen graduate as radio and radar technicians, control tower operators, jet mechanics, administrative specialists, missile technicians, photographers, and specialists in hundreds of other jobs essential to the Air Force mission.

A few airmen who are already trained specialists because of their civilian backgrounds spend seven more weeks at Lackland in basic



training then go directly to technical jobs. Still others who are not selected for technical training also finish their basic training at Lackland. Enlisted women get eight weeks of basic training before entering a technical field.

Besides Lackland, ATC technical schools are located at Amarillo AFB, Tex., Chanute AFB, Ill., Keesler AFB, Miss., Lowry AFB, Colo., and Sheppard AFB, Tex.

When an airman leaves ATC and heads for a using air command, his training is not over. ATC's 3499th Field Training Wing, with headquarters at Chanute AFB, takes the classroom to students at bases and commands throughout the world to give extended instruction and specialized training. This field training program permits many technical schools to provide instruction through only the fundamental phase of a course. Students are then assigned to an operational unit and spend half of their time for a period of four weeks on their job learning more about it. The other half is spent in advanced instruction provided by the field.

By getting an airman on the job sooner where he is face-to-face with the problems involved, he immediately sees the value of technical knowledge and is stimulated to learn more during the field portion of his training. The field training program is also a partial answer to another Air Force problem: lengthy and costly training that the man who doesn't reenlist takes back to civilian industry.

Constant Facelifting

But the changing face of Air Training Command is not made up entirely of new courses, new aircraft, new students, and new equipment to fit modern training needs. New management methods are constantly being sought that will improve still more the present—and future—quality of training. Portions of a long-range plan to consolidate and centralize the organizational structure of ATC have already been completed.

Four years ago ATC had 43 training bases scattered all over the United States. Last year the number of bases had been reduced to 37. With the recent transfer of McConnell AFB, Kan., and its mission of B-47 transition training to SAC and the transfer of Luke, Williams, and Nellis AFBs and their missions of advanced fighter training to TAC, ATC now has only 25 bases.

At Keesler AFB, students are given practical training in electronics.

In mid-1957 ATC Headquarters moved from Scott AFB, Ill., to Randolph AFB, Tex., and simultaneously, consolidated the functions of Flying Training Air Force and Crew Training Air Force under a single headquarters which also was moved to Randolph. This move put ATC Headquarters geographically closer to 14 of its main bases which are located in Texas. Two of ATC's six contract schools are also in Texas.

Then this spring the functions of Flying Training Air Force were absorbed by ATC headquarters and in June Technical Training Air Force headquarters was absorbed. Lt. Gen. Charles T. Myers, ATC's former commander (retired since July 31), estimated that this consolidation will save more than 5.6 million dollars a year in operating costs.

Keeping Pace

This is the changing picture of Air Training Command brought about by the ever increasing demands of modern Space Age combat-readiness. For every change in weapon systems, for every revision in the philosophies of mangement, and for every new Air Force requirement, the training program must also be revised, sometimes minutely, other times infinitely. Often, the slightest change may demand the training of new instructors, the writing of new manuals, the building of new equipment, and the revising of current programs.

Instances of this are numerous:

Airmen meet the KC-97 face-to-face in this flight simulator at Randolph AFB.

. . . For example, in August, 1955, instructors of the ATC school for missiles at Lowry AFB compiled one of the first manuals for guided missile training to be used in early missile courses. Since then, the Navy has adopted the book for use in Navy missile courses, and ATC has had requests from scores of colleges, universities, and industries for *Guided Missiles Fundamentals*. Last September, this ATC manual became Air Force Manual 52-31.

. . . In 1954, the Air Force assumed control of its own recruiting organization for the first time, and the mission was given to ATC. With headquarters at Wright-Patterson AFB in Ohio, ATC's 3500th USAF Recruiting Wing still handles Air Force recruiting. Recruiters are trained at a special school at Lackland and then join one of the 61 recruiting detachments throughout the U. S.

. . . In late 1957, USAF directed ATC to set up a Marksmanship Training Center at Lackland. The center was needed to develop a program which would reemphasize small arms proficiency throughout the Air Force. Small arms skill is now considered part of the basic military knowledge for our personnel. The objective is creation of a high level of marksmanship in people who wear small arms in the performance of their duty.

Perhaps the three single factors most expressive of this largest of the Air Force's major commands are its diversity of training, its massive scale of operation, and the importance of its end product.

The Air Force needs people qualified in hundreds of different skills. Training is demanded for most of them, from the fundamentals of the beginner to the complex knowledge of the specialist, and from small arms marksmanship to missile guidance systems. Throughout ATC history there has been a determined effort to develop higher quality through constant revision of the recruiting and training programs.

Of the end product, it can be said that the Air Force has never entered a period of its existence where the skill of an able man is more important.

Technology in a Space Age Air Force indeed presents a paradox. It does not take the place of man. Instead, it makes the human element, trained to think and trained in technical skills, more important than ever before.

Students and instructors work on a B-47 bomber at Sheppard AFB, Tex.

Training Tricks and Trials

Instructors in physiological training courses often witness startling personality changes in their students during "ascents" in the altitude chamber. As oxygen masks are taken off to allow students a sample of hypoxia, extremely reserved individuals may become extroverts, laughing and telling jokes while the class "know-it-all" goes on a crying jag.

★ ★ ★

Electronics have come to the aid of foreign students learning English in order to attend USAF schools. Called a "Language Trainer" the device uses dual-track tape recording equipment to assist students in rapidly understanding words and phrases. Tape recordings enable the student to hear the instructor's pronounciation of a word and his own together. By reviewing the tape he can work on the word until his pronounciation is perfected.

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ATC's field training wing takes the classroom to the students wherever they are located. Training aids accompany instructors when they are ordered to a new site. Training a man to maintain the hydraulic pressure system on an F-102, for example, requires a full-scale layout of the system. Models are illuminated and animated to show flow of different pressures and the action of all accessories. Training aids of this type are available for all the various components of aircraft in use by the Air Force, and are designed so that they can be flown to the training site and quickly set up for instruction.

★ ★ ★

People entering the Air Force from civilian life are classified at Lackland AFB, Tex., according to jobs performed prior to enlistment. Classification people are stumped at times by enlistees like the fellow who taught kids to spin yo-yos . . . or the snake and animal skin sorter! Another had been in business for himself. He walked tipsy nightowlers home after bars closed.

TITAN of tech training

by T/Sgt. Harold L. Craven

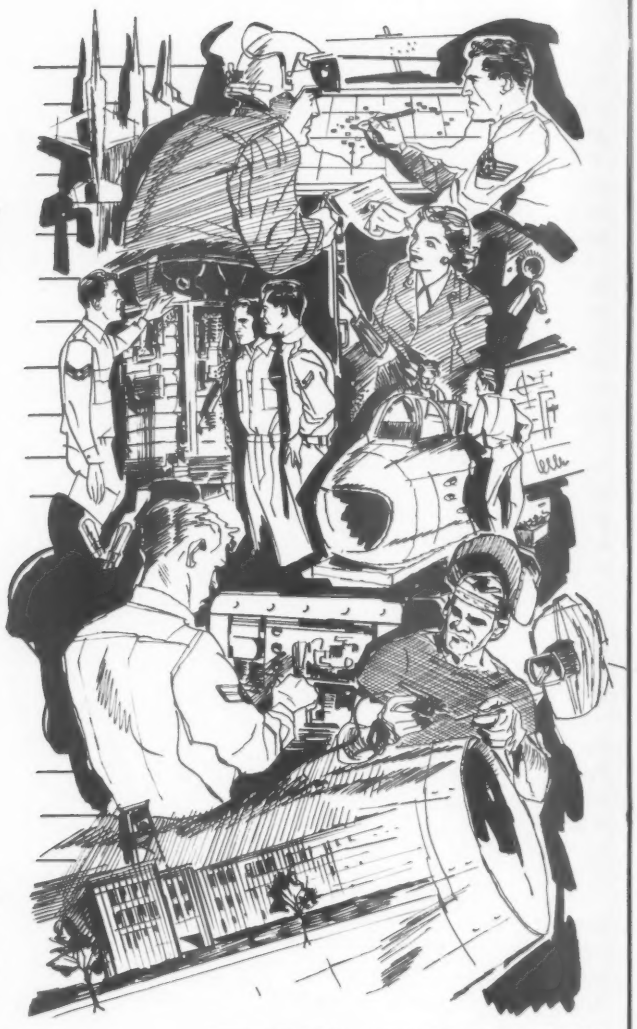
Because it's had lots of practice, Chanute's adept at training students.

If citizens of nearby communities hadn't intervened, Chanute AFB, Ill., might now be the site of a hospital for defective and delinquent Federal prisoners. Instead it is one of the most modern aviation training centers in the world with 5,000 resident students of demonstrated high potential.

Chanute is an Air Training Command installation valued at more than $230 million. It has a monthly payroll of more than $4 million and an annual operating cost in excess of $100 million. A $15 million construction program now underway at the base includes a $5 million ballistic missile training facility and $10 million in personnel housing construction and improvements.

In 1930 Secretary of War Patrick J. Hurley announced that the air base would be closed and that the site would be used for construction of a new prison hospital facility. Illinois citizens, many of whom had helped build the base as a World War I pilot training school, protested vigorously and Chanute remained an aviation school. Their action that year helped win World War II, for Chanute was destined to become a key wartime training base that would graduate more than 200,000 enlisted mechanics and engineering officers in the crucial 1940-1945 period.

Today Chanute is the home of the 3345th Technical Training Wing which has resident training responsibilities in one-third of the Air Force's airmen career fields. As such it is the most sought-after technical school base in the Air Force. A tenant organization, the 3499th Field Training Wing, is the nerve center for Air Force field and mobile training activities scattered around the world.



Drawing by Robert D. Smith, GRAPHICS-AFCSS-PS-2

The resident school currently offers more than 100 technical courses for military and civilian personnel of our Air Force and members of the air forces of friendly foreign nations. Students are being graduated from these courses at a rate of 1,200 per month. By this time next year the student population is expected to increase approximately 50 percent.

Training is provided in 12 airmen career fields. They are: weather; guided missile systems; training devices; aircraft and engine maintenance; metal working; fabric, leather, and rubber; aircraft accessories and equipment maintenance; supply; education and training; production control; munitions and weapons maintenance; and aircrew protection. Next month, following transfer of equipment and instructor personnel from Francis E. Warren AFB, Wyo., instruction in the motorized and miscellaneous equipment career field and in the utilities career field will begin.

Have Instructors, Will Travel

The Field Training Wing, Chanute's extension course branch, has graduated nearly 145,000 technicians in the past year at some 170 field and mobile training detach-

ments around the world. Every type of Air Force plane, including the B-58 *Hustler* and the century series fighters, is within the training capabilities of this organization's instructors, along with the latest unmanned aerial weapons. In addition to its technical training responsibilities, the wing provides assistance in conducting local on-the-job training programs in nontechnical career fields at host bases.

Chanute's training wings are as new as tomorrow, in quality of instruction, training materials, and equipment. They provide the best training available anywhere in maintenance of reciprocating, jet, and rocket engines, and other components of curent and future, manned and unmanned, weapon systems, and in many support skills necessary for proper employment of these systems.

To qualify pipeline personnel for instructor duties (the base now has about 1,000 instructors), Chanute has an eight-week instructor training program. The first four weeks of training parallel an abbreviated State Teachers Education Course, and include methods and techniques of teaching—covering such subjects as effective learning, oral expression, lesson planning, and training aids.

The second four weeks are used to make practical application of what has been learned the first four weeks. Under the watchful eye of senior instructors ITP students conduct classroom and lab sessions.

If the new instructor needs additional training following the eight-week course, it is available through an in-service training program. Last year approximately 300 airmen completed the in-service training while nearly 1,500 instructors were graduated from ITP. Approximately 700 were trained for service with the 3499th Field Training Wing.

Personnel selected for student or permanent party assignments usually look forward to their reporting date with a great deal of eagerness. Chanute's recreational facilities are known to be among the best in the Air Force; shopping facilities are excellent; the bright lights of Chicago are only two hours distant by fast train; and new personnel are given the full red carpet treatment beginning approximately 30 days prior to their arrival.

"Of course, if that happens, there's gonna be one awful boom!"

When special orders are received at Chanute, usually a month before the individual is scheduled to arrive, a welcoming letter and data questionnaire are mailed to him. When the questionnaire is completed and returned, wheels begin to turn. If the airman has indicated that he is married and plans to bring his family, temporary quarters are reserved for them and he is so notified. He is also told what his assignment will be; that a list of off-base housing will be available to him upon his arrival; and if he is eligible for Government housing, approximately how long he will have to wait.

Upon the airman's arrival at the base, he is directed to the Family Service Center (whether he is married or unmarried) to begin his processing. At the center he is introduced to his military sponsor—a member of his new organization of equal or higher rank—who will assist him in getting established in his organization and in the Chanute community. In the event a newly-arrived Air Force family needs pots and pans, baby cribs, dishes, or other small household items, a loan department will provide them.

On-base shopping facilities include an ultra-modern base exchange which provides many services and a large, well stocked commissary. The base has seven chapels and a religious center for airmen and their families.

A modern 200-bed hospital, completed last year, and an up-to-date dental clinic are available to military personnel. A low-cost family dental clinic, provided through the Family Assistance Program, has been established on a dollar-per-month-per-family basis to provide dental care not available under the Medicare program.

Chanute has one of the largest and finest service clubs in the Air Force, one of the best NCO open messes, and an excellent officers mess. There are two theaters, four hobby shops, a sports arena, two gymnasiums, an 18-lane bowling facility, a golf course, a roller rink, three swimming pools, 14 tennis courts, three football fields, seven softball diamonds, a soccer field, and a track and field area. No effort has been spared in the development of the base into a well equipped institution at which airmen can enjoy life while undergoing technical training.

During most of its 41 years, Chanute has been recognized as one of the best aviation schools in the world, although the Chanute of recent years contrasts sharply with that of several years back.

Early History

Immediately after the United States entered World War I in 1917 the French made an apparently impossible request: that we train and equip, for duty at the front within a year, a 5,000-pilot, 4,500-plane air force. At the time we had only 55 military planes—none suitable for combat—and approximately 65 officers, 50 student pilots, and 1,100 enlisted men assigned to aviation duties.

The Rantoul *Weekly News,* Rantoul, Ill., announced early in May, 1917, that the Rantoul Aviation Field had been selected as a flying school site and that "work would commence at once in putting the tract into proper shape for aviation purposes." The crash program that followed

that brief announcement is one of the great stories of World War I.

Trees had to be cut down, stumps dynamited, farm buildings located near the middle of the 640-acre plot moved, and hangers and other buildings constructed. To get the job done quickly, every carpenter and building mechanic within a hundred miles was mobilized and every farmer who owned a wagon was called upon to haul lumber.

Capt. C. C. Edgar, project officer, told the 2,000 workers that thousands of pilots were needed at the front as soon as possible. He asked them to forget personal considerations and make completion of the airfield their primary goal. Farmers neglected their crops in order to speed the project. Normal working hours were forgotten in the rush to complete the flying field. On July 7, before the construction was completed, the first planes arrived.

The presence of planes and pilots spurred the workers to even greater efforts. It was obvious that training would begin as soon as they finished their job. The workers met and were impressed by the aviators, including Maj. J. S. Dunsworth, the commanding officer, Capt. Roy S. Brown who would be in actual charge of flying, and Capt. J. C. McDonnell, hailed in the press as "one of the foremost experts in the Army in the tailspin and in the intricacies of maneuver."

Before the field was completed young men began arriving from many parts of the United States to enlist in the Air Service. They were adventurous men from many walks of life, students, laborers, farmers, and even millionaires, with one goal: to become a part of the most glamorous part of the armed forces, the Air Service of the Army Signal Corps. One officer who arrived at the airfield that year, Capt. T. J. Henley, later recalled that he could look down his line of men and count seven enlisted men whose combined wealth exceeded $11 million.

When one wealthy NCO tried to cash a $100 personal check at the First National Bank in Rantoul, a bank official took the precaution of making a telephone call to the sergeant's bank to investigate the check's validity.

"Go ahead and cash it," he was told, "and if he wants to buy your bank, sell it to him. He owns this one!"

The flying field was completed in less than 12 weeks, accepted for the Government by a party of Federal officials, including Maj. H. H. Arnold, who called it "one of the best-equipped flying fields in the Army," and named Chanute Field in honor of aviation pioneer Octave Chanute.

During the remaining 15 months of the war, pilot training was conducted at a hectic pace, at Chanute and at other airfields. At first the standard pilot training course was only eight weeks in duration, during which each student would amass 50 to 60 flying hours. Upon graduation he was considered qualified for combat duty.

The adventures of these bold young men were many and the tales of their exploits, legendary and true, spread rapidly across the Illinois countryside. One pilot, for example, is said to have lost control of his airplane at a high altitude and descended so rapidly that his eyeballs froze. They didn't thaw out until he was within a hundred feet of the ground, at which point he righted the plane and made a perfect landing.

Chanute Field in 1936 during Second Army maneuvers.

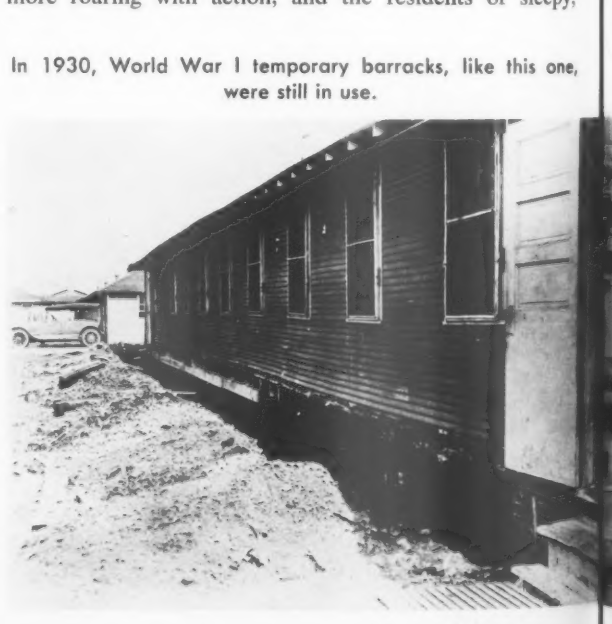
When the war ended on November 11, 1918, the total number of pilots graduated was 16,169, and 1,323 were undergoing training. The Air Service had grown to 200,000 men and 8,403 airplanes, and its pilots had logged 20,676 pursuit, observation, and bombing flights over enemy territory.

Following "the war to end all wars" public interest in military aviation waned, and Chanute became a temporary storage depot for OX-5 engines, manned by a commanding officer, an adjutant, a corporal's guard of soldiers, and a dozen civilian watchmen.

In 1921 the base was given a new mission, one that has continued until this day. Ninety freight cars, loaded with equipment for training aviation mechanics, rolled in from Kelly Field, Tex.

The Chicago *Tribune*, on March 27, 1921, reported: "After months and months of inactivity, Chanute Field, where many of our aces first grasped joysticks, is once more roaring with action, and the residents of sleepy,

In 1930, World War I temporary barracks, like this one, were still in use.



tranquil Rantoul are being awakened in the morning by the roar of Liberty motors and lulled to sleep in the early evening by the same voluminous drone."

In 1922 the Air Service's photographic and communications schools, previously located at Langley Field, Va., and Fort Sill, Okla., respectively, began operations at Chanute. It seemed to residents of Rantoul and surrounding communities that the base they had built was now assured a permanent place in the future of aviation. Thus they were surprised and shocked when the Secretary of War made his 1930 announcement that Chanute would be transformed into a hospital for defective and delinquent Federal prisoners.

Don't Shoot Him, Chanute Him

There were times in the 1930s when students probably wished that the base had become a prison hospital. Living conditions were well below comfortable standards and it was standard procedure in winter months to wear overcoats in the barracks. Poor living conditions, plus the fact that transportation facilities to medium or large cities were inadequate, made Chanute something less than a choice duty station. Instead it was regarded by many as a sort of Siberia to which were sent personnel who had incurred disfavor in high places, and this belief was father to the witticism "Don't shoot him! Chanute him!"

In the 1938-1940 period, armament, photography, and clerical schools were moved to Lowry Field, Colo., and the radio school to Scott Field, Ill., permitting Chanute to devote all its resources to instruction of aircraft and engine maintenance and engineering students. More than 200,000 enlisted mechanics and engineering officers were graduated at the base between 1940 and 1945. In its peak wartime year, 1943, more than 63,000 students earned diplomas. Wartime students found life at Chanute even more unpleasant than it had been in the 1930s. Training was accelerated; classrooms were in operation around the clock; living quarters were overcrowded; recreational facilities were inadequate; and a heavy schedule of training in military subjects reduced leisure time to a minimum.

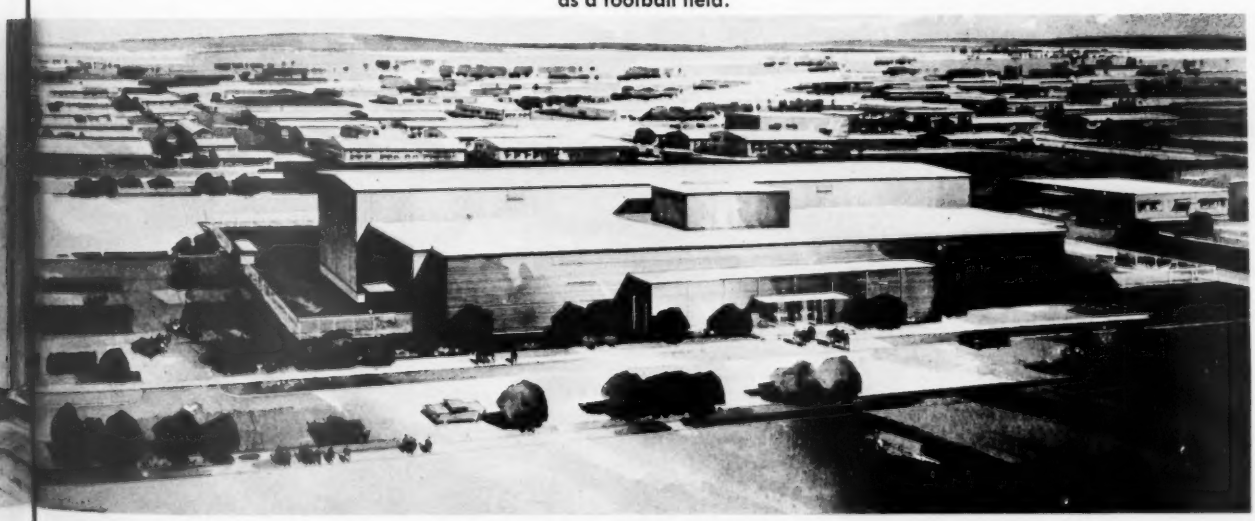
Following World War II the headquarters of Air Force mobile training activities, with a staff of 500 instructors, moved from Buckley Field, Colo., to Chanute. When the Illinois base moved into the jet age in 1947 as the resident school for Air Force jet mechanics, the "flying professors" began preparing to establish appropriate extension courses in the field.

Resident and field training programs were accelerated by the outbreak of hostilities in Korea. When the fighting ended the Nation looked to Strategic Air Command bombers as a strong deterrent to Communist aggression, and thousands of young men were trained at Chanute in the maintenance of B-36, B-47, and eventually B-52 bombers and supporting aircraft. In the meantime rapid progress was made in missile development and appropriate training facilities were provided. A new $5 million ballistic training facility project is now underway.

Student morale kept pace with aviation progress during those years. It has continued to climb. Anyone who attended classes there during the war years would be amazed at the attitude of the technical school student of 1958. Life at Chanute is no longer the rugged ordeal it once was.

World War II barracks are still in use as student quarters, but they are no longer overcrowded. They will eventually be replaced by dormitories. On-base recreational facilities rank with the best in the Air Force. Instructors are qualified as leaders and teachers as well as technicians, and this results in a congenial classroom atmosphere. Training aids used by the students are the best available, completely up-to-date. As a result of these and many other factors Chanute has achieved new fame as one of the world's greatest aviation schools, a technical institution where young Americans can study, enjoy life, and establish themselves as specialists in the growing aviation profession.

Tomorrow Chanute will boast ultra-modern missile training facilities including this school building which covers an area as large as a football field.



Because It's Cheaper

That's the simple reason why civilian schools give pilot trainees roughly one-third of their training.

by Capt. Ted R. Sturm

It wasn't the need to save dollars that prompted the late General Henry H. Arnold to spark a program that saw 64 commercial flying schools turn out a quarter-of-a-million military pilots during World War II.

It was the pressing need for as many pilots as an expanding Air Corps could get its hands on, and there flatly were not enough military schools to meet the challenge.

After the war the schools were closed, but later—in 1948 when the surplus of pilots and dollars both mysteriously evaporated—the Air Force realized that more pilots had to be trained; and as economically as possible. After considerable study, the civilian contract school concept became a permanent part of Air Force planning and in early 1951 the first contract school since 1945 opened for business.

Today six schools are in operation throughout the United States. For the past seven years, they have proved that they can provide the primary phase of pilot training as qualitatively —and far more economically—as completely staffed, military schools can.

"Turn left at that cloud, watch out for those birds, your right wing is high, pay attention, look at fuel gauges, you're going too fast, . . ."

How?

They operate on a cost-plus, fixed fee contract, and are unfettered by the normal regulations governing other Air Force schools. Under the contract, the schools must provide primary flying and academic training, housing, food, recreational facilities, supplies, support and maintenance of both base and aircraft, and police and fire protection. Naturally, contractors are required to provide all the qualified personnel to fulfill the obligations. The Air Force provides the students, the aircraft, and equipment.

At each contract base, there is a military commander and staff which handle check rides and strictly military functions such as ceremonies, military training, and discipline.

Most schools employ about 132 civilian instructors, who perform the contractual services. The military contingent usually numbers between 30-35 people, excluding the student load which is currently set at 360.

One factor which results in reduced operating cost is the minimum turnover of civilian personnel. The civilian contractor doesn't worry about reenlistment rates, requisitioning scarce skills, and overseas quotas.

He has complete flexibility in hiring and firing, so there is no delay in filling vacated positions. Backed up with reasonable wages, fringe benefits such as medical care and hospitalization, workman's compensation, group insurance, and leave, most schools can hold their personnel turn-over to about four percent annually.

Another factor contributing to economical operation is that instructors and other personnel devote a full shift to their primary job, free of such problems as extra duty, KP, etc. And there is a hidden advantage to the Air Force. Most of the instructors are World War II or Korean conflict veterans. So the Air Force gets an indirect return on the otherwise lost investment of the initial training given these instructors.

A Few Strings

Naturally, the civilian contractor doesn't romp merrily along his airborne trails without close supervision and control. The military commander at the base provides check pilots who keep a close eye on student development; the contract administrator (a military man who works closely in a liaison capacity with the contractor and military commander) watches how the money is spent; standardization directives put out by Air Force keep all the schools going in the same direction; and standardization boards set up by ATC ascertain that standards are maintained.

Reports, inspections, curriculum development, and a myriad of limitations provide adequate checks and balances. This is a small miracle in itself. With all the controls, the schools still retain complete independence in management practices. And through closely coordinated activities, the whole machine meshes with such dexterity that the final product—a pilot—is of unquestionable quality.

Lt. Gen. Charles T. Myers, former ATC commander, said that the generalized type of flying instruction required in primary flying training lends itself excellently to the contract concept.

"The Air Force is receiving a well trained primary pilot, it gains monetarily, and is able to release trained and experienced officers and airmen for assignments to more purely military and tactical positions."

Then Why Not Basic?

The obvious question, after watching contract school operation, is: *Why not use the same concept in basic and advanced training?*

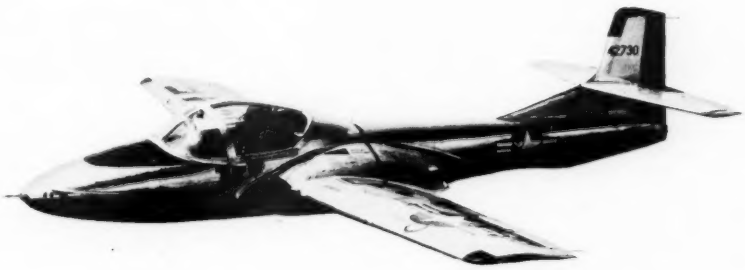
A moment's reflection reveals the answer to be as obvious as the question. When a student finishes primary, he has learned to fly, but not to use the aircraft as a weapons system. This is the job of basic and advanced training, where he learns the rules of combat, teamwork in a military organization, and how tactical units are operated. He learns administrative and support functions—knowledge which is readily applied in combat units.

And he gets the latest word from the personal experiences of the veterans of latest jet aircraft. Thus, the primary schools operated by the civilian contractors are superb in their area; but of necessity they must operate within this framework and with definite limitations.

There is little question but that the contract schools will continue to give primary training to our pilot trainees. General Myers was precise on that point.

"Our future plans definitely call for continuance of the contract school program."

Considering the record of USAF pilots who have benefited from this program, combat unit commanders should be pleased with General Myers' words.



CURRENT CONTRACT SCHOOLS

Situated in four states are the six civilian contract schools currently in operation for the Air Force. Logically, the schools are located in areas where the climate is most conducive to the first flights of embryonic pilots. Two schools are located in Florida. They are Graham AB, operated by the Pittsburgh Institute of Aeronautics, and Bartow AB, a function of the Garner Aviation Service Corporation.

Georgia also boasts two—Spence AB, operated by the Hawthorne School of Aeronautics, and Bainbridge AB, Southern Airways Company. Moore AB, in Texas, is run by California Eastern Aviation and in Missouri, Anderson Air Activities handles the training at Malden AB.

where's my mail?

by M/Sgt. Ed Blair
Airman Staff

Military personnel staff 300 APOs scattered all over the globe. Last year their customers bought $18 million in stamps and another $153 million worth of money orders. They provide mail service wherever the fighting man goes. In Korea, even Francis, the famous Army mule was pressed into the Army-Air Force Postal Service to deliver mail to the frontline troops. APOs are taken for granted but they form a very vital part of military life.

AIRMAN Second Class Ned Jones was unhappy. He stepped up to the stamp window and growled at the guy in fatigues behind the counter.

"What's with this APO business? I haven't had a letter since I got over here. I thought you post office guys always bragged that snow and heat and all that stuff couldn't stop the mail. Has that ocean got you licked?" Jones paused, out of breath.

"You gotta write 'em to get 'em, Mac," the fellow in fatigues answered. He put his elbow on the counter and the three blue stripes on his sleeve showed.

"That slogan is for the Post Office Department," he continued. "I'm in the Air Force. *You* guys slow us down, not the ocean. Come around through that door and I'll clue you in on APOs."

Jones was still unhappy when the airman in fatigues led him back to a chair. The postal clerk checked the date on a rubber stamp, inked it, and began marking the stamps on a pile of letters as he talked.

"First, we're an extension of the Post Office Department, not a part of it. They can't operate outside of the States, but we can. There's six of us Air Force types here at this APO. We're assigned to the Air Postal Squadron down at the port, directly under the major Air Force command. This is just a detachment.

"The sergeant sitting over there is detachment NCOIC and first sergeant. His desk is our orderly room. The lieutenant is CO and Postal Officer. We use Post Office Department regulations and run this APO just like your hometown post office. They sent us to school for a few weeks and the rest we learned here on the job."

"Coming over here I stopped by the Postal Concentration Center just outside of New York. The Post Office Department has several of them—wherever overseas military mail is processed. If it wasn't for APOs it would cost more to send mail beyond there."

He tied a string around several piles of letters, scribbled something on a card, slipped it under the string, and dropped them in a bag.

"The New York center looks like a big warehouse," he went on, "and mail comes in by the ton. Civilian crews sort it out by APO and separate it by postage classification—airmail, first class, newspapers, parcel post, and so on. They tie up everything going to the same squadron

or unit in bundles and put it in the same bag. That way it doesn't have to be handled so much, saves a lot of time."

Airman Jones cut in when the clerk paused for breath. "The system sounds fine up to there. But I suppose the military takes over then and balls it all up."

"You can't make me mad," the postal clerk replied. He was busy locking up the pouches, some with just one or two bundles in them. "It takes a lot of work to keep up with all our outfits overseas.

"There's a Port Postal Officer at the center who has a list of all the units at each APO. When a squadron moves or has its name changed, he tells the sorting crews so the mail for that unit goes over to the crew that works that APO. It's like an assembly line. The bundles come addressed to the APO, New York, San Francisco, Seattle, —wherever you are. They sort and rebundle it and mark it for the right APO.

"This officer helps them figure out the fastest and most direct shipping route from the center to the APOs. All parcel post, newspapers and that sort of mail goes out by ship—unless it's going some place like Thule up in Greenland, or an isolated island in the South Pacific where ships don't often stop. In that case, they send all of it to the nearest MATS base for airlift. But usually the Government gives contracts to commercial U. S. airlines to carry airmail into all areas where they operate."

"Yeah, I remember reading somewhere that it's cheaper," Jones volunteered. "The Government subtracts part of the money they pay them for mail contracts from what they pay in subsidies."

"That's right," the postal clerk agreed. "Faster too. See, MATS has a lot of engines, troops, supplies, and other high priority cargo to airlift from the ZI and sometimes they have to let the overseas mail wait. But commercial airlines have room."

So Where's My Mail?

He sat down across the table from Jones, sorting loose cards from a box marked "clearances" and shoving them into a card file.

"When these ships or airlines unload the mail down at the port here on the continent, the mail regulating section—that's another detachment of our squadron—sends it out by the fastest transportation available. Theater planes fly ours up because the trains over here are too slow and expensive. APOs closer to the port send a truck in after theirs."

Jones interrupted again. "I think I get the picture, but you haven't answered my question. What about *my* mail?"

"All right." The mailman held up one of the cards. "See these cards? There are over 5,000—supposed to be one for every man on this base. Has his name, rank, service number, and his squadron on it. About 15 Joneses here. Let's see . . . your first name is Edward? Edward J., or Edward N.? Assigned Headquarters Air Base Wing?"

"No, I used to be when I first got here." Jones' face reddened. "I'm . . . they reassigned me to the maintenance squadron," he stammered.

"You didn't change your locator card." The postal clerk shook his head. "You guys sure expect a lot for seven cents."

The mailman penciled a correction on the card, then reached into a basket of mail marked "directory service." He pulled half a dozen letters out and handed them to Jones.

"Some of these came over a week ago. Tomorrow they would have gone to the command directory down at the port. They have a card file there where they check up to see if your squadron has moved. We only keep cards six months after you leave here. If your card had been right, you'd have had your mail. Better tell them at home to change your address."

"Oh, I already changed the return address on the envelopes." Jones was meeker but happier now. Then he added hastily, "Guess I better tell them though, in case they didn't notice. You guys have a pretty good system here."

His benefactor brightened. "It's a big system," he started again. "Know how much mail went through APOs last year? Over 66,000 tons."

Jones stood up. He studied the cancelled stamps on his mail. He wanted to read it. The postal clerk followed him across the room, still talking.

"Worst thing is," he complained, "everybody keeps moving. We can't keep track of them. Like you—if everybody forgot that locator card we'd have a real mess. Wouldn't have room to stack the mail while we ran them down."

Jones was moving faster now. He mumbled his thanks and ran a finger under the flap of an envelope as he went down the steps.

"That's the way it is," the man in fatigues called after him. "If anybody else in your squadron isn't getting their mail tell 'em to check their locator cards."

But A/2C Ned Jones didn't answer. He walked on, head down, reading his mail.

SANTA NEEDS A HEAD START

Postal officials have cautioned airmen worldwide that parcels destined for overseas APOs must be mailed between Nov. 1 and Nov. 20 (regular parcel post) and before Dec. 10 if shipped airmail to insure delivery by Christmas. No delay in handling and delivery of letters is anticipated.

in my opinion

"... Prepare for Promotion"

by M/Sgt. John P. Pope
Richards-Gebaur AFB, Mo.

Sergeant Pope entered the service in 1942. For the past three years he has edited *CADF Facts*, a newsletter for military personnel assigned to the Ground Observer Corps program in 19 states.

An object lesson can be obtained for every airman, who wants to benefit from it, from what is happening in the present selection of M/Sgt E-8s and E-9s.

For years, except for an occasional application for warrant officer, the master sergeant has accepted the attitude that he has no chance for promotion. If he keeps his nose clean, he will retire as a master sergeant. In addition to this, the average airman who decides on an Air Force career, assumes as his inalienable right that he too will retire as a master sergeant.

Maybe it is time for the career airman to examine himself. This examination will reveal that during the period of promotion from basic airman to staff sergeant, promotions were automatic. Automatic because there was very little competition for them. The largest discharge rate is in airman first class and staff grades. Thus, due to normal attrition, there are always vacancies. Automatic because, if an airman makes the fact known that he is a career airman, he has a better chance for advancement than the short timer. Automatic because, if he knows his job technically, he will be promoted.

So, the happy and successful career airman makes staff in four years. With the grade of staff comes the first adverse break in the airman's career. First and foremost, he must *wait* (and he takes this word literally) 14 months before he is eligible for tech. In addition to this temporary stumbling block, is the indefinite one of frozen upgrading to the 7-level skill.

Faced with 14 months plus an indefinite number of years of no promotion, the career airman assumes the "Why work?" attitude and takes it easy. When the promotions do open up, the said airman is passed over for the so called 'politician.'

How does the so called 'politician' avoid this pitfall? He is the career-minded individual who planned his career from the first day in service. Maybe his recruiter prepared him for promotion when he explained the Air Force career. Maybe one of his supervisors opened up his eyes. Regardless of how it came about, this man devoted himself to the cardinal rule for success—"Prepare yourself for success and you will attain it."

While learning his technical job along with the other airmen, he asked himself, "What does promotion mean? More money? Yes, but in addition to money, it is another step to the top of the ladder." He also considered, "When the automatic promotion cycle is over and the going gets tough, who is promoted?" He remembers Sergeant Jones whose common expression is, "I'm a technician. How can I lead a formation?"—(S/Sgt. with 7 years in grade.) And Sergeant Smith, "I'm a technician. I can't do paperwork."—(Another S/Sgt. with umpteen years in grade.) His buddy who says, "What are you working so hard for . . . 'bucking'? You know you can't be promoted for several years."

But, he also remembers the officer who said, "I'm loaded with technicians. What I need is an NCO technician who can supervise them." He also remembers the excellent technician staff sergeant who had to supervise the section in the absence of the NCOIC and failed miserably. After weighing both sides of the story, he saw that in addition to being a technician, he must also learn to supervise. He studied courses on leadership, writing, public speaking, etc. He is constantly striving to increase his potential to the Air Force.

His supervisor recognizes his worth and moves him into a supervisory position. (Now he's a 'politician.') Naturally, when promotions opened up, he was the only one they thought of promoting. This was the result of the simple process of preparing for promotion when there was no chance.

This is the lesson that can be learned from the E-8, E-9 promotions. The masters who sat and waited for retirement are the ones who are screaming the loudest about the supervisor test.

The common statement, "It isn't a fair test because those who applied for warrant had taken the test before and it was easy for them," proves the "preparation for success" theory. What they don't consider is, that these same master sergeants had to improve themselves in their career fields. (Many had never taken the 7-level test before.) In doing so, they were proclaiming to the Air Force that they were sure they knew their job and were ready for promotion. Let all frozen airmen take heed! Unless there is preparation for promotion, there is *no*, repeat, *no* promotion!

SLANTS ON SPACE

Total eclipse of the Sun, Canton Island, June 8, 1937.
U. S. Navy Photo

/// Coming up for Columbus Day is a solar eclipse which at the moment of totality will make the Moon a black bull's-eye in the skies. On October 12, beginning about dawn, the Moon as seen from a long, narrow zone on the globe will pass directly between the earth and the sun, casting a shadow on the Earth along its path. The eclipse will begin close to the equator northeast of Australia and travel eastward across the Pacific, reaching western Argentina at sunset. For almost two hours the sun will be at least partially obscured. A new wrinkle in eclipse observations will be tried this time by a U. S. IGY team, based on the Danger Islands, a minor group between Samoa and Tahiti. Eight specially instrumented *Nike-Asp* rockets will be sent up to altitudes from 150 to 180 miles. If the missiles are successful in recording data above the Earth's absorbing atmospheric blanket which thwarts earthbound optical telescopes, scientists hope to get clarification on many mysteries about the Sun and the true characteristics of interplanetary space. The Danger Islands are administered by New Zealand.

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/// Don't buy reports that shortly before mid-August the U. S. scored a spectacular near-miss in getting a lunar probe cone into orbit during a topmost secret dress rehearsal test launch. If you happened to be a skywatcher who picked up a luminous object apparently coursing through the night heavens toward the Moon, that was no lunar rocket you saw but Mars. This neighboring planet was just entering a cycle which will make it show brighter to ground observers than at any time since early 1957. The intensity of this brightness will grow through September and October, reaching its peak in November, then diminish slowly. Airmen who hope to get a glimpse of a lunar rocket in trajectory should keep this in mind and not be duped by this Martian malarkey into jumping to conclude a Moon launch has been made.

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/// WAF Note: The first successful manned missions in orbit will not necessarily mean that space flight can be expected to go co-ed automatically. The reason is that females have a greater fluid component in their make-up than males. Space medicine experts say this raises a question mark for would-be orbiting WAF flight attendants until more has been learned of the behavior of bodily fluids under conditions of weightlessness.

/// An orbital hassel between a couple of NCOs has been checked to this column for refereeing. Origin of the rumble is a forecast on manned space missions attributed to an unnamed DOD official to the effect that future vehicles would be developed with capabilities of hovering or following directed, non-orbital flight patterns. S/Sgt. A says that's for sure. S/Sgt. B contends no can do. What is the right word?

In the strict sense of the word *no* satellite or any other object can "hover" or remain stationary in space. Everything there has to be in motion or in terrestrial space it would be pulled back to the surface by the Earth's gravitational force. Hence "hovering" or stationary space platforms and bases, a la Buck Rogers, are scientific myths. However, a groundling would get the illusion a satellite was "hovering" or motionless above a given point on our planet if it was put in an ellipse at a distance of about 20,000 miles out with a velocity identical with the orbital period of the Earth, *provided* the satellite's orbit is circular and its orbital plane is coincident with the equator. That's going to be the neatest trick of the week when it's done, chums.

As for "directed, non-orbital flight patterns," the purported statement could have been referring to what is called an open-ended orbit such as a parabola or a hyperbola (geodesic ellipse). If the words were intended to mean what they say in simple English, somebody is riding a nonexistent beam.

/ / /

/// The paths artificial satellites—manned or unmanned—must follow was set forth in a basic formula almost three and a half centuries ago. It was in 1609 that Johannes Kepler, German astronomical genius, first put into writing the laws governing the motion of all celestial bodies. The velocity required for any particular orbit or mission is computed on principles enunciated a few decades later by Sir Isaac Newton, the character who is supposed to have been hit on the noggin by an apple. His law of gravity includes this assurance about reentry: an object falling toward the Earth from a mathematically infinite distance will never exceed the velocity of about 25,500 miles per hour.

/ / /

/// Space duty in peacetime won't help personnel, military or civilian, whittle down on those income taxes unless the Internal Revenue changes its mind. Current IRS policy is that all pay for such TDY is subject to Uncle Sugar's cut just as if it were earned on a ZI base. This hits USAF civilian specialists who currently are allowed extra exemptions while assigned out of the country. Rumor has it IRS thinks it may have a collection problem on its hands when space travel missions begin to involve several months or teams go to one of the small Martian moons for a year's TDY. The Internal Revenue Service, however, is in no hurry to insert "and External" in its official name.

—WILLIAM A. KINNEY

Middle East Alert

RIGHT on the heels of the July landing of Marines in Lebanon, the U. S. Air Force began putting world-wide units in a position of readiness for any eventuality.

From Donaldson AFB, S. C., a force of troop-carrying MATS C-124 *Globemasters* moved to an undisclosed destination.

From Ardmore AFB, Okla., a dozen huge propjet C-130 *Hercules* transports provided airlift and logistical support for air and ground operations in the Middle East. Their primary mission: support of the Tactical Air Command Composite Air Strike Force—tactical bombers (B-66s and B-57s), fighters, reconnaissance aircraft, and tankers—which had flown overseas *post haste* from east coast bases and were operating from Adana Air Base, Turkey. Flying nonstop, the first fighter-bombers were in Turkey 12 hours after they were alerted.

Doubledecked C-124 *Globemaster* carries troops of Army's 187th Infantry from Germany to Adana, Turkey, in the troubled Middle East.

Rapid movement of the Composite Air Strike Force to the Middle East began within four hours after orders had been received committing the TAC combat trained units to stand-by duty at Adana. Most of the flights over the Atlantic from the U. S. to Turkey, July 15 and 16, originated from two major TAC organizations.

Tactical Air Command Headquarters at Langley AFB, Va., deployed tactical bombers and aerial tankers in several waves, supporting the various phases of the operations in the Middle East.

The first element of fighter aircraft made the nonstop over-water flight in just 11 hours. They covered a distance of 6,470 statute miles at an average speed of 582 m.p.h. The fighter craft made connections with the aerial tankers for several inflight refuelings. The entire force completed the move from the U. S. in three days.

Strategic Air Command and Continental air defense units were alerted and went on an "improved readiness" status.

Quick reaction to the situation demonstrated the versatility and flexibility of TAC's Composite Air Strike Force and the high state of professional training and teamwork capabilities of our airmen.

The operation demonstrated USAF global mobility—its capability to rapidly transport an air task force, troops, and supplies for duty and service anywhere on the globe where needed.

Air Force C-130s offload jeeps, men, and equipment at Beirut. Background airline terminal sign reads: "Welcome to Lebanon."

Upon arrival at Adana, Turkey, support and flying personnel of the Composite Air Strike Force are briefed on the current situation.

Col. Francis S. Gabreski, Commander, 345th Tactical Fighter Wing, Myrtle Beach AFB, sees off Lt. Col. Devol Brett who led the first group of fighters overseas.

by A/1C Mary E. Cowan
Airman Staff

Visit to MARS

TODAY I visited MARS. Not the planet, but Headquarters, Military Affiliate Radio System located on the concourse in the Pentagon. Sgt. Alyan Hill, a member of the staff, took me on a "Cook's Tour" of the "shack." In the first room we entered an airman was sending a message in International Morse Code on a telegraph key. Sergeant Hill explained with a string of technical terms what was going on, but all I got from the conversation was that the airman was in contact with Ramstein AB in Germany.

In the next room another airman was contacting Selfridge AFB in Michigan. In this room was a giant console on which several radio circuits can be worked simultaneously. There were also switchboards for telephone patches, teletype machines, and numerous gadgets that defy description.

This bustling activity of transmitting and receiving messages, telephone patches, and logging messages in and out was all very confusing, because the picture of MARS I had in mind was of a remotely located shack on some base used by Hams (amateur radio operators) to contact each other for bull sessions or to send an occasional message home for some of the personnel on the base.

MARS' mission, I discovered, is far more complicated and important than that. It is an organization comprised of Air Force, Army, and civilian members whose primary aim is to provide a source of trained communications personnel instantly available during civilian disasters or military crises.

In an emergency the hand of MARS is constantly giving aid. Take for example the aid MARS gave in Menomonie, Wis., when the town was badly damaged by a tornado this summer. All telephone lines in the area had been knocked out, so MARS at nearby Snelling AF Station contacted the state police and offered their assistance. They were told to report to the sheriff's office in Menomonie. Mobile units were set up at the courthouse to be used as a base station. Other units, cruising throughout the area to locate places in which work parties were needed, relayed information to the base station, which, in turn, notified courthouse personnel as to the location and number of people needed for the area. After contact with the local radio station, arrangements were made for the station to announce MARS would take, and relay messages going to relatives and friends anywhere in the world.

Besides handling traffic from mobile units and messages for members of the community, MARS personnel made an hourly check with the Badger (Wis.) state net to pick up any traffic they had going out of state. In addition, frequent checks were made on the regular MARS frequency to dispose of any traffic there. The airmen manning the mobile units worked around the clock, transmitting and receiving messages until telephone service was restored three days later.

Bryan, Tex., was given similar aid when the town's communications lines were damaged by a tornado.

Tornadoes, Fires, and Illnesses

When a forest fire broke out in the Sacramento Mountains, Holloman AFB's MARS was on the scene in a matter of minutes to set up a link between the fire area and the base.

At Pepperrell AFB, Air Force MARS member, S/Sgt. Robert H. Wilder was contacted by a Canadian amateur in Northwest River, Labrador requesting telephone communication to Goose Bay. Telephone circuits were inoperative at the time so Sergeant Wilder made a phone patch to the Canadian Control Tower at Goose Bay. Arrangements were made to fly a doctor to Macoovic, Labrador, to care for a patient. Within minutes after the sergeant had been contacted the medic was notified of the emergency.

These are but a few samples of the daily activities of an organization whose members are strictly volunteers. Members of MARS, especially in the case of civilians, carry on most of their activity after duty hours.

Prior to 1950 MARS was composed of military members only. When civilians 21 years or older, were allowed to join, enthusiasm and interest ran so high the age limit was lowered to 16. Within a few years the organization had increased to over six thousand members and is still growing.

A prime example of Hams who give unstintingly of their time for the welfare and morale of people the world over is Jules Madey, a teenager in Clark, N. J. Jules works until the wee hours of the morning receiving radio messages from the South Pole. He is not the only Ham who does this, but was the first to make contact with the geographic South Pole and his cellar has now become a sort of "clearing house" for messages radioed to and from the men assigned at the pole with Operation Deepfreeze. When the men at the pole try to contact the folks back home, nothing is more heartening than to hear Jules' familiar voice saying: "This is K2KGJ making a phone patch. Request all operators on this frequency standby until completion of phone patch. Thanks for your cooperation and here we go!"

If there are no phone patches to relay Jules gives the ball scores, headlines, and other small talk of interest to men at the pole.

Incidentally, a phone patch is a connection between radio equipment and telephone. For example, Jules picks up a call from the pole on his radio and connects the caller, via telephone, with his party in New York. The only charge involved would be the fee from Clark, N. J., to New York.

Portable units installed by operators in their cars take the facilities of MARS over an even greater area.

A civilian worker at Elmendorf AFB in Alaska was worried about her parents during an earthquake in California. She had the base MARS station contact California. The relay got as far as Hollywood where it was discovered contact could not be completed because telephone lines were down in the area where her parents were living. However, contact was made with a Ham who was cruising through the vicinity of the earthquake. He quieted her fears by driving through the streets as she directed and telling her if the buildings she described were undamaged.

To the members of MARS, this quick response to calls for help in emergencies is all part of a day's work. Despite the fact that they are giving such aid daily, back files at Hq, MARS, USAF had to be researched to dig up the incidents which were cited. Says Capt. William E. Bettis, Chief, MARS, USAF: "These incidents are just sideline activities most of which are never reported because they are incidental in the carrying out of MARS' mission which is to provide an additional source of trained volunteer communications personnel and a system-in-being of needed communications facilities instantly available to military commanders during local or national emergencies."

Contributions, Too

In addition to welfare and morale services, MARS members have made large contributions to the improvement of military and commercial communications and equipment, particularly in the single sideband and radio-teletype fields.

In the jigsaw puzzle of organizations which comprise the Air Force, MARS is the important piece needed to complete the picture. So essential is MARS to the Air Force mission that practically every base has a going MARS station and funds are set aside by most commanders for the upkeep of the station and equipment.

Col. Ray W. Ballard, Director, MARS, USAFE summarized MARS' usefulness to the Air Force: "The true value of MARS . . . is its availability in the event of emergencies. This means civil disasters as well as military crises. As a matter of fact, should a dependent evacuation ever be necessary MARS stations would be expected to bear a good share of the communications load to put the plan in action and see it through."

Judging from past performance, the men of MARS are quite capable of carrying their share of the load. And as long as there is anyone fascinated by the knobs on a transmitter the Air Force will be assured of a constant worldwide network of communications coverage, ever on the alert to aid anyone calling MARS.

S/Sgt. Joseph C. Malinouskas ("Murph" since few can pronounce his name) operates MARS station at McMurdo Sound in the Antarctic.

Medal of Honor
of the United States Army

Medal of Honor,
the Navy

". . . The President is authorized to present,

In The Name Of Congress. . . ."

by M/Sgt. Hal Bamford

The Medal of Honor, America's highest award for its military heroes, has led a checkered life through its near-century existence.

Until July 9, 1918, the Medal was passed around with a readiness which reduced the dignity and importance Congress intended it to have. But on that date, Congress enacted a new law standardizing all facets of the Nation's highest accolade.

Today, the Medal of Honor is universally accepted as the highest recognition of individual heroism in military action that this Nation can bestow upon an individual.

The Medal holds a unique position in American history. For all practical purposes it is the first permanent decoration created by Congress. The Purple Heart predated the Medal of Honor by nearly 80 years, but it was established in 1782 by the personal action of General George Washington.

Prior to creation of the Medal of Honor, Congress had authorized other individual medals in recognition of a single deed. And other methods of reward such as a Certificate of Merit and the brevet promotion had been established between 1782 and 1861; the latter date being the year the Medal of Honor was created by Congressional action.

On December 21, 1861, President Abraham Lincoln signed into law the act of Congress authorizing presentation of a Medal of Honor to enlisted personnel of the Navy. Two months later similar action was started on a medal for enlisted personnel of the

Army and this version was officially adopted in July 1862. In March 1863, an amendment was passed making officers eligible to receive the Medal.

Three Revisions

The Medal and accompanying ribbon have undergone a total of three major changes since they were established. In 1896 and 1944 the changes involved the ribbon; the Medal itself took its present form in 1904.

Confusion which exists in relation to this famed decoration extends even to the name. Commonly referred to as the Congressional Medal of Honor, this, in reality, is a misnomer. The decoration's official titles are: the Medal of Honor of the United States Army (also for the Air Force) and Medal of Honor, the Navy.

Both still exist as coequal partners. There are differences in the Medals, but basically the ribbons are the same. The Navy Medal is of course reserved for award to members of the Navy, Marine Corps, and Coast Guard. A total of 916 have been presented during its history.

The name Congressional Medal of Honor probably came into being because the act of 1918, which established the present method of award, read in part that it was to be made "in the name of Congress."

Early in its history the Medal lost a portion of prestige by being awarded on a "too often" basis. For example, during the Civil War an entire unit of 864 men was honored in this manner.

Finally in 1917 a board of review was established to investigate the cases of all 2,625 Army Medals which had been awarded to that date. A total of 911 names, including all 864 from the single unit, were stricken from the list. Since then, through the Korean conflict, names have been added more judiciously and today the Army roll of honor lists but 2,196, which includes Air Force awards.

The Medal has been presented for heroism in nine wars. The Civil War list includes 1,200; Indian campaigns produced 416 more; War with Spain, 30; Philippine Insurrection, 70; Boxer Rebellion, 4; Mexican Campaign, 1; World War I, 95; World War II, 292; and Korea, 78. Two men were designated by special acts of Congress between WW I and WW II—Charles A. Lindbergh and retired Maj. Gen. Adolphus W. Greely.

Eight Unknown Soldiers have received the decoration. In addition to the Unknown Soldiers of the United States, those of five Allies of World War I also were decorated with this Nation's highest award by special Congressional action. The unknown dead represent England, France, Italy, Belguim, and Rumania. The most recent additions were the WW II and Korean unknown Americans. President Eisenhower made these presentations in Memorial Day ceremonies this year.

The First Award

The first Army Medal was awarded to Col. Bernard J. D. Irwin for a deed which took place before the Medal had actually been created. The event occurred in February 1861, in action against Cochise and the Chiricahua Indian warriors in the region which is now Arizona. The award was not made until January 21, 1894, a circumstance which could not happen under present law.

Recommendation must now be made within two years of the act involved, and the Medal issued within three years following the date of the action meriting the award.

First physical presentations were made to six soldiers of the Federal Army in March 1863 for their exploit in the disruptive Civil War cloak-and-dagger mission memorialized in a full-length movie entitled, *The Great Locomotive Chase*.

Since its inception, 47 men directly associated with the Air Force have received the award. Strangely enough, although this number represents an extremely small percentage of the overall total, Charles A. Lindbergh, now a brigadier general in the USAF Reserve, was the recipient of one of the two interim awards made between World War I and II. It was in recognition of the first solo flight from New York to Paris in 1927.

Among other oddities which have marked the history of the Medal is that only one father and son team has ever been so honored—Maj. Gen. Arthur MacArthur, Jr., and his son, Gen. Douglas MacArthur.

The Medal carries a two dollar per month pay increase during the period of the recipient's active duty, and at age 65, they are entitled to a special pension of $120 annually.

Only four members of the Air Force received Medal of Honor recognition during World War I. The first airman to receive the Medal was 2d Lt. Frank Luke, Jr., in posthumous ceremonies in 1919. However, an earlier Air Force action was eventually recognized and honored in 1931. This event involved 1st Lt. Eddie Rickenbacker and predated, by four days, that for which Luke had been cited. The late presentation was accomplished under provisions of special Congressional action which waived the three-year period to assure that all deserving recommendations from World War I received proper consideration.

Five Medals

Most distinguished USAF mission, in point of decorations awarded was the initial Ploesti raid on August 1, 1943. During that action, no less than five Medals of Honor were presented to Air Force participants. No other single air raid in history received such universal acclaim.

The most current legislation has established the Medal as the highest possible award conferred by this Nation. It can be merited in only one manner—by a deed of personal bravery or self-sacrifice, above and beyond the call of duty, while a member of the American Armed Forces in actual combat with an enemy of the Nation. The deed must be certified by two eye-witnesses and be so outstanding as to clearly distinguish the gallantry as beyond the call of duty. It must involve the risk of life, and must be the type of deed that would not bring unjustified criticism to the person if not performed.

The risk of life clause is clearly demonstrated by a look at the simple figures which distinguish the 47 Air Force recipients. Of this total, 30 have given their lives in acts leading to the Medal's award.

This is the first in a series of articles dedicated to the men of the United States Air Force who have received the Nation's highest honor. Individual articles on the recipients will be published beginning with the next issue.

Mythology of Flight Daedalus and Icarus, courtesy of The Smithsonian Institution.

NOT BY A *Single Bound*

by William A. Kinney

Heaven is not reached by a single bound;
But we build the ladder by which we rise
From the lowly earth to the vaulted skies
And we mount its summit round by round.

—JOSIAH GILBERT HOLLAND
in *Gradatim* (Gradually)

"THOU hast made him a little lower than the angels." The words are from the Book of Psalms (VIII, 5) and become especially appropriate since celestial space with its extravagant glories of light and matchlessly coordinated order has been from time immemorial associated in the human mind with the home of those bodiless pure creatures, the angels, who assume corporeal form only when on earthly missions. Prior to the Christian era, the ancient civilizations looked upon it as the home of gods and believed only their messengers could roam its reaches. In more primitive religions it was the abode of the spirits who controlled the lives of earthlings, their crops, and their weather. All ages have regarded it with mystification, awe, fear, hope, and prayer.

In our introduction to aeromedicine's approach to the serried questions affecting manned space flight provided by last month's article, we considered in some detail the status of professional scientific readiness as regards the major problems which arise to assist man to get safely from the ground to the point where his spacecraft has attained escape velocity which is in the order of 18,000 m.p.h.

The subjects dealt with covered the physiological and psychological screening of candidates to give us the most promising spacemen volunteers; a list of the skills, aptitudes, and talents which would enhance a prospect's value for such duty; one phase of their pre-mission conditioning; a description of the packaged artificial atmosphere system of the cabin or capsule in which he will go aloft; the means to be employed to stabilize its temperature at comfortable levels; and the G-factor—the gravitational stress to which his body will be subjected by the violent acceleration at launch and then twice or more times later with the firing of the rocket system's successive propellant charges. The description of the G-factor included a report on how aeromedicine is ready to combat it.

Thus we have covered the "first bound" of our title, taking our hypothetical space duty volunteer through screening, selection, some of his training, to the launch pad, through blast off, and then to escape velocity as his spacecraft is about to orbit.

Virtually everything involved in all this has an almost everyday familiarity to an airman reader. With the exception of the higher G-factor, there have been no conditions, equipment, or systems not in use or encountered daily in the operation of conventional aircraft, military or experimental, and extreme altitude manned balloons on exploratory missions at heights of space flight equivalence.

As our hypothetical spacecraft hurtles into orbit, the nothing-is-new stage ceases. Henceforth everything is new, from the strange, wide new world through which the spacecraft courses in its ellipse to the physical and psychological condition of its oc-

cupant. The initial orbit or so completed successfully represent the second giant bound toward achieving man's ambition to ply the inviting reaches of space with the ease he first plied the lands, then the seas, the depths beneath them, and finally the very air he breathes.

One admonitory note recurred frequently in the extensive consultations I had with physicians and others connected with the multifarious phases of the space medicine research and preparatory program. It was this: medicine and its sister sciences already know and can anticipate many new conditions and phenomena an orbiting spaceman is certain to encounter and hence have him ready to take them in stride, so to speak. However, some surprises are expected to materialize, perhaps discouragingly unexpected ones which create a whole horde of new problems that may take a long time to lick.

Like unforeseen events developing to upset the proverbial plans of mice and men, new celestial discoveries may be reported by the present type of instrumented satellites and some may not materialize until the first manned missions. These unsuspected or unexpected turns may cause a profound revision of medical or other scientific thinking on the validity of key concepts in which mistaken trust was put for what seemed like a foolproof solution of a problem as it now appears. The reader should remember this in his appraisal of the various space flight conditions, effects, and consideration of "the second bound" on which we now resume the countdown.

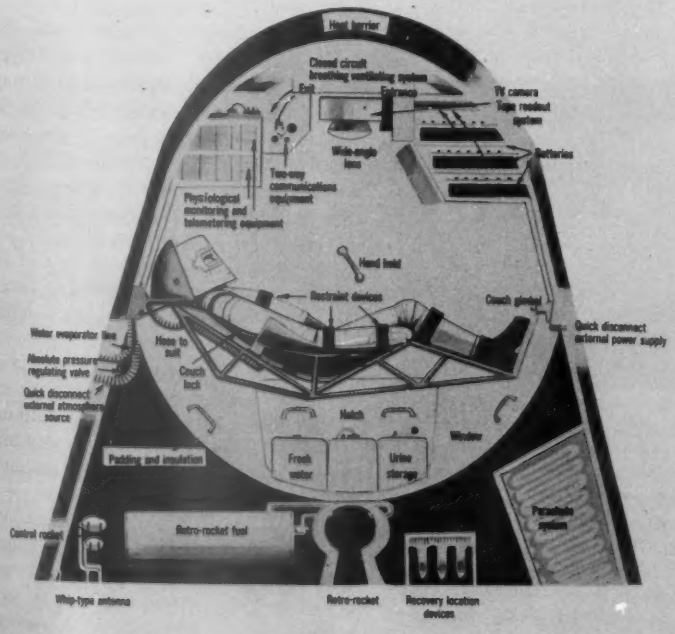
Breakoff phenomenon: When the Earth has been left several miles below, airmen experience a mental feeling of complete disassociation from their native planet. The first to describe this sense of complete divorcement were the Stratoflight pioneers of the 1930s. Usually the psychological reaction does not occur until after an aircraft has passed into areas of partial space flight equivalence above 50,000 feet, although in some isolated cases it has come lower.

The nature of the reaction is not identical. With some the sense of sudden complete independence and escape has produced a surge of physical exhilaration and spiritual awareness, suggestive of the "reach out and touch the face of God" mood described so movingly in *High Flight,* the poem by Pilot Officer John G. Magee, Jr. In such cases, the urge was to fly on.

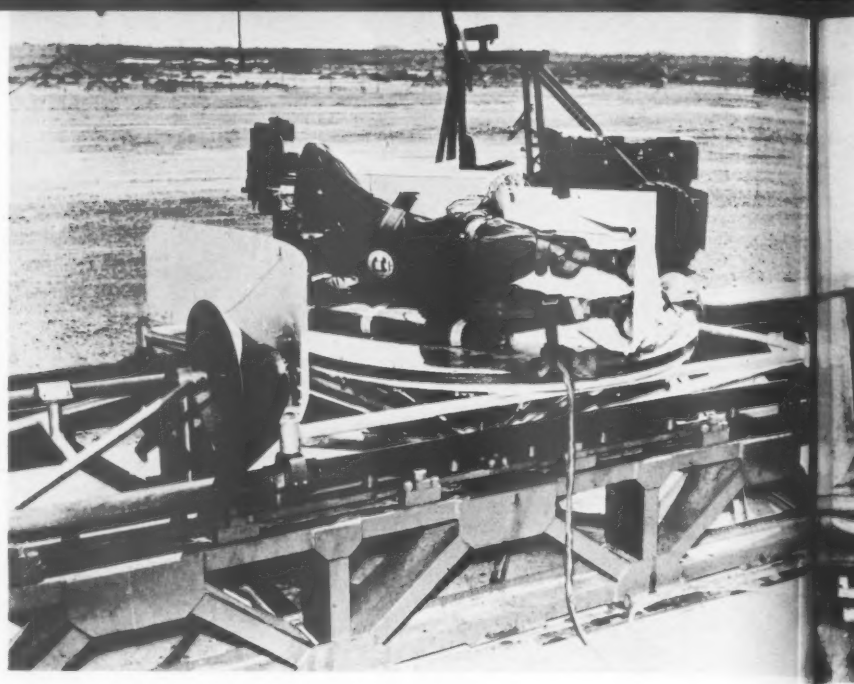
Others, among them the first Stratoflight crews, have marked the illusion of severance as new but in an incidental way which did not distract them from in-flight duties.

With still others, the breakoff sensation has been accompanied by a feeling of gradual release from responsibility, a listless what-difference-does-it-make frame of mind. This reaction was reflected by inattentive or ineffective handling of assigned tasks, a lethargic performance unacceptable for true space flight.

In one experiment evidence developed that a crew's sense of elapsed time went badly haywire after an early morning flight of a few hours. Although landing before the morning was spent, the men thought it must be late afternoon. This evidence is



TOMORROW'S COCKPIT: How a pioneering Air Force spaceman's orbiting domain may look is shown in this cutaway drawing of an artist's conception of a future spacecraft cabin. The spaceman reclines on a padded couch to protect him from the stress of the increased G-forces which occur from launch to the last stage firing and in the buffeting of reentry. In the interests of maximum performance reliability for both man and the cabin system, every foreseeable comfort as well as automatic device has been included in this cone capsule. The occupant's breathing and pulse rates, temperature, and other physiological reactions would be telemetered to Earth as he wears a packaged atmosphere environment in protective helmet and clothing.



TAKE IT LYING DOWN: It's easier that way if what a man has to endure are the abrupt, heavy G-stresses which go with rocketing to orbit. Current Holloman AFB rocket-sled tests indicate G-stresses are less sweat in this sideways reclining position. Start position (left) shows how subject protects his head. Ride's end (right) shows another sport-capped subject smiling with hands undisturbed. Compare his easy expression with strained, tortured look on face of upright-positioned man (page 34) nearing (panel 2) and at the end (panel 3) of ride, despite padded helmet and protective garb.

not considered conclusive for it may be explained by an emergency of some stress the mission encountered. Should this recur, however, in future experiments not involving emergency stress, we may have a new phenomenon to puzzle over.

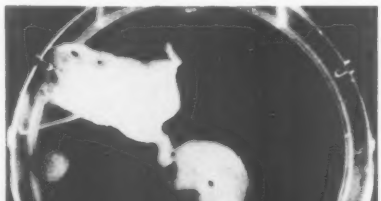
Men who can take the breakoff with little or no distraction present no problem. Mental discipline conditioning will enable the exhilarated types to keep an adequate rein on their soaring spirits. Whether or not a training program can overcome the tendency to absent-minded indifference is uncertain.

Weightlessness: Conditioning subjects for short periods of multiplied gravitational pull pales as a problem when compared to preparing them to function efficiently when gravitational pull ceases—the so-called Zero G or weightlessness phenomenon peculiar to orbital flight.

Once a spacecraft gets into its ellipse, the pull of gravity ends or, to be scientifically precise, it is neutralized by an opposite force—the centrifugal effect created by the vehicle's velocity in its trajectory. While Zero G state exists, human occupants of a cabin would float suspended in midair unless strapped securely in their flight positions.

Any loose object, be it a pencil or some sizable equipment item accidentally unseated by the initial thrust of launch, would do the same.

Weightlessness currently confronts aeromedicine with a veritable thicket of question marks to be negotiated. What is its effect on the normal bodily functions, the working of the mind, as well as the psychosomatic interplay between the two? Will it impair the operational efficiency of future space crews and, if so, to what degree? By training can man adjust himself to reliable activity in this hitherto unnatural state for indefinite periods or will his tolerance prove limited to periods of predictable duration? These summarize the major points on which research has concentrated, and each one has ramifications.



HOLD ON: Camera snaps pair of research mice in a rotating drum. Scene, shot during a zero-gravity period, shows mouse in center (background) grasping sides of platform to maintain equilibrium, while mouse in foreground floats in air. Note ball suspended away from the sides of the drum. Experiment demonstrates that mammals able to hold on to something can orientate themselves and not be affected by Zero-G.

As readers are aware, an experimental program for inducing the Zero G phenomenon has been in progress some time, utilizing jet and rocket aircraft to fly high velocity parabolas during which the weightless condition is produced. It lasts, however, only a fleeting 15 to 40 seconds before the aircraft must pull out. Even the cumulative data from many such brief tests is admittedly slim basis for scientific inductive reasoning to arrive at firm physiological and psychological findings of fact.

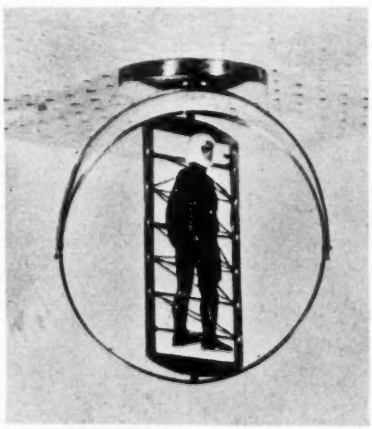
Taking the body first, the study of human subjects to date has detected no resultant general disturbance, as a rule, in the operation of the autonomic nervous system regulating breathing or the circulatory system.

On the other hand, numerous organs which normally feed man a steady, reliable flow of information on conditions about him and the like become upset with the onset of weightlessness and are rendered useless for trustworthy perception. The eyes, however, remain relatively unaffected and the reliance space crews will have to place on their vision to keep oriented will be markedly greater than in all the past decades of flight. The sense of balance is upset because of the effect of weightlessness

on the non-auditory labyrinth of the inner ear organ which enables man to distinguish equilibrium and motion in his normal environment. Despite the disturbance of this organ, man's hearing continues normal, so do his smell, taste, and sense of touch. Other normal perceptions which desert him, however, are the sensation of recognizing deep pressure and the kinesthetic sense which tells him whether the members of his body are limp or in variouse alert conditions up to tautness.

Even man's vision plays tricks on him at first. Years of experience have made man's brain an almost infallible lightning computer under normal circumstances in processing data caught in a single glance of the eye and gauging almost instantaneously the exact amount of effort the muscular system should put forth for a given action. Our lightning computer proves erratic in its first experiences with weightlessness. Pilots invariably found themselves in trouble with handling aircraft controls because they automatically overreached—the result of the eyes' calling for the usual amount of muscular energy required for the act in a normal gravitational environment. Man's incomparable intelligence system has demonstrated, however, it can speedily adjust to Zero G conditions as the tests are repeated.

In mental reactions, human subjects fall into three groups. The smallest numerically are the individuals who found the sensation quite pleasant the first time they were subjected to it and also in subsequent trials. Those in the second group, which represents the majority, experienced feelings ranging from mild disquiet to serious disturbances at their introduction to the Zero G state but reported the conditions increasingly easier to accept as they kept repeating the experiment. The third group consists of those whose panic stricken initial reaction persisted or deteriorated during further tests.



MERRY-GO-ROUND: Newest simulator device, shown in model form, induces sensation of weightlessness by duplicating five of the six motions which may be encountered in space flight. Trainee, secured on bedlike frame, may be rotated rapidly on that device while the inner circle to which its axis is fastened tumbles end-over-end while also being spun simultaneously by the rotational movement of the curved arms attached to its sides. Piston-like shaft (not shown), housed in the ceiling fixture base adds up and down movement.

Research experiments with human subjects have been supplemented by work done with laboratory animals, notably the rheusus monkey. This animal has been studied by the medical profession so extensively over the years that some eminent authorities assert that "in many ways more is known about its biology than that of man, himself."

As with human subjects, no significant changes have been detected in the monkey's cardiovascular or respiratory systems after rocket-propelled flights producing a weightless condition now several minutes in length. These primates are anesthetized for such flights. The humane care SOP for the animals is attested by the fact that a goodly number, automatically "retired" after a fixed number of tests, are very much alive and in good health, some as long as half a dozen years after excursions in special nose cones which took them some 40 miles into space and subjected them to about 15 Gs.

Inasmuch as pioneering space flights by humans will be comparatively short in terms of elapsed time, we have no misgivings about aeromedicine's ability to select the right individuals to complete them successfully despite orbital weightlessness or any other unusual new factors.

Clearly, however, it will take men-in-space to provide aeromedicine with the fuller information it must have eventually on the effects of the weightless state, among other things. No electronic mechanisms, for example, can be devised to brief us on how the human mind and spirit may react, say, in a 100-minute ellipse around the Earth when man has never transited that circuit. Similarly, no intricate automatic device relaying reports on how lower forms of life function in actual space flight can provide wholly reliable guide data that man's biological processes will duplicate the pattern. Apropos of this we already know that certain organisms exist in a state of suspended anima-

tion at extreme altitudes without protection in an atmospheric environment lethal for mere man.

Some data to be supplied by the first men to brave space will have an immediacy in medical application. Other types will give research the measure of long-range problems. One of the most intriguing is whether Zero G conditions on future exploratory missions taking several months, a year, or even more can be expected to have an arresting influence on the body's growth.

Diurnal cycle: Another peculiar feature of orbital flight is that day and night become meaningless terms. Periods of light and darkness succeed each other in a matter of hours or less. This is because a spacecraft in ellipse passes a number of times each chronological day through the tapering, cone-shaped shadow which the Earth casts into exterior space for a depth of almost 860,000 miles. This shadow is a zone of darkness.

The frequency and length of alternating light and dark periods depend on the altitudes of a satellite's ellipse. One with an apogee of about 1,000 miles and a perigee of 150 miles would complete a circuit approximately once every hour and three-quarters. Each pass would take it through the greatest width of the cone's darkness, a transit requiring almost 44 minutes. For the next 61 minutes the spacecraft's hull facing the Sun would be drenched by dazzling solar radiance, although due to the absence of atmosphere the sky on the hull's other side will be black, except where the stars burn with a steady, intense brilliance.

TRY A WHIRL? A flip of that switch will start trainee spinning like proverbial whirling dervish. Compressed air supports and rotates platform with minimal friction. Trainee can't manipulate controls (left). As he tries to reach them, his movement toward the panel box serves to turn him away from them. Simulator produces one type of weightlessness phenomenon but only in a single dimension.

For the health and efficiency most men must have a regular daily cycle of wakefulness and activity, as well as of rest and sleep. Centuries of conditioning have made the vast majority identify activity with the daylight hours and repose with the night. Dr. Hubertus Strughold of the School of Aviation Medicine, probably the foremost figure today in the professional battalion of specialists seeking solutions to space problems, has written as follows on this particular subject:

"Adequate diurnal cycling is of great importance to the health and efficiency of man. In fact we are psychologically so strongly adapted or bound by the day-night cycle, manifested in rest or sleep and wakefulness or activity, that it must be regarded as a biological law. To ignore this law, after a week or so, would lead to a complete nervous breakdown."

Other physicians I was able to consult cited the long medical studies which have established that human vitality is lowest a few hours before dawn and also mental efficiency, although occasionally there seem to be numerous enough persons who prove exceptions.

Since the relatively rapid succession of periods of light and darkness

BEFORE, DURING, AFTER: The facial expressions of the "Human Decelerator" Col. John P. Stapp, capsule graphically a rocket-sled-ride story. In panel 1 he sets jaws determinedly just before ride starts. Next panel shows how peak acceleration forces head and body back against seat. In panel 3 Stapp is hurled forward against seat harness by violently abrupt stop producing 10-G effect, making officer's body feel as if it weighed the equivalent of ¾ ton. The AF flight surgeon, veteran of the many rocket rides which won him the "Human Decelerator" nickname, signals OK to waiting ground crew in final panel.

SPACE MEDIC: The world's first professor specializing exclusively in space medicine, Dr. Hubertus Strughold, started dreaming of manned flight beyond the Earth's atmospheric frontiers away back in the 1920s. German-born, this physiologist came to the U. S. in 1947 and last March was named to his history-making professorial post at the School of Aviation Medicine, Randolph AFB. A prolific writer and talker on space medicine topics, Dr. Strughold here holds forth animatedly on his favorite subject.

in space flight tends to disrupt the normal day-night cycle, acceptable future astronauts will have to be men physiologically and psychologically capable of adjusting to the topsy-turvy character of a calendar day in space if they are to maintain their well-being. This means that a goodly number of well-intentioned volunteers will be rejected.

No dearth of suitable personnel will occur, however. A reliable physical and psychological screening program has been worked out for selecting the right type men. These will include those who can be conditioned by training to a different time schedule for work, relaxation, and sleep, as well as those exceptional individuals whose physical and mental efficiency seemingly runs high when in the majority of mankind vitality is at a low ebb.

It should be pointed out here that the expression, diurnal cycle, is not necessarily synonymous with day and night as happens to be the case for most of humanity in normal life. Rather it is a matter of having a fairly regular schedule for utilizing one's time, and countless persons have demonstrated the capability of transferring an activity from certain hours of the day to later and even opposite times by the clock.

Conclusive proof of this exists in the sizable army of night workers who perform very exacting jobs with high efficiency and alertness while the rest of the world sleeps. These include hospital staffs, newsmen and printers, communications and transport workers, police and firemen, and many military personnel.

In the first stage of systematic sorties by manned vehicles into space the relatively short duration of most anticipated missions makes the diurnal cycle question largely an academic matter from the viewpoint of aeromedicine. As missions extend to several days and into weeks or longer, it will become an increasingly immediate consideration which calls for careful monitoring.

What the ideal budgeting of a 24-hour cycle is likely to prove cannot be forecast with reasonable assurance for lengthy missions thus far in advance. Only the cumulative experience on human reaction developed over a series of exploratory flights can establish that with reliable scientific case reports. It does appear now to be almost a hard certainty that both the psychological and physiological stresses invariably characterizing pioneering ventures into the unknown make it medically desirable that those members of space crews on duty have comparatively short tours in hours, and be spelled with frequent regularity. Later we may find it practicable to work up to six hours' duty, six relaxation and recreation, with a minimum of six hours' sleep or more, the additional time to come from the recreation period.

Buffeting: Notably at the reentry stage, space flight may go through an interval of violent buffeting. Personnel can expect some jolting but the use of rubber foam or other resilient materials in their seats will cushion the worst of it. As pilots become proficient in the skip-glide reentry technique the buffeting can be spaced out in periods of fairly brief duration.

Under this general heading I would include the short intense period of vibration at the end of countdown when rocketcraft shudder on the launch pad. Because the vibratory phase is so shortlived, our belief is that provisions such as those just described will make it tolerable for space personnel.

(To be continued next month)

SAVED BY A SQUEEZE

IN USAF PRESSURE SUITS

by Maj. Owen F. Connolly

Formerly with the Department of Aviation Physiology, Gunter Branch School of Aviation Medicine

Front view of the MC-4 partial-pressure suit for fighter pilots. Note the helmet tie-downs, clear plastic facepiece, and capstans on arms and legs.

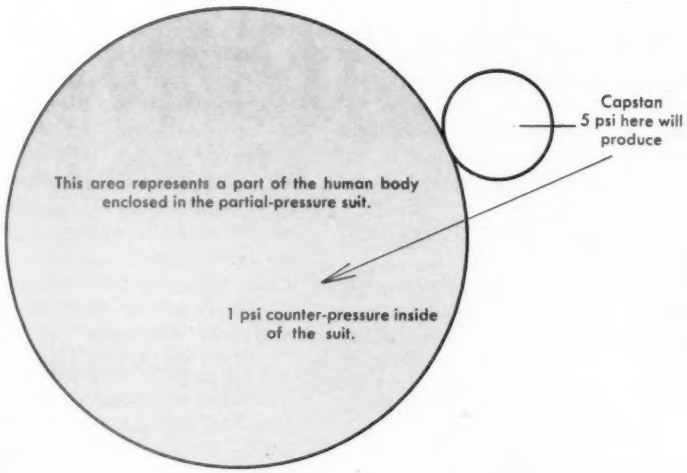
MAN lives at the bottom of an atmospheric ocean. When he leaves this environment to fly at altitude and eventually in space, he is exposed to a reduction in atmospheric density which causes physical changes within his body. Thus, he must be protected by special survival equipment such as the altitude suit which is designed to maintain man in an artificial environment comparable to his normal habitat.

History of the altitude suit started with the discovery that life could be supported in a vacuum by pumping pure oxygen into the body. Many interesting attempts have been made to translate this simple physiological fact into practical form. Early work on development of high-altitude pressure suits was carried on in England, Germany, France, Russia, and the United States. These early attempts resulted in construction of a mobile, form-fitted, pressurized cabin capable of surrounding the enclosed subject with an envelope of pressurized oxygen.

While attempting to set an altitude record, in the 1930s, Wiley Post wore a suit of his own design which was crude and provided very limited mobility. However, it served its purpose. In 1937 Lt. M. J. Adams of the Royal Air Force wore a full-pressure suit in his record altitude flight of 53,000 feet. With the suit on, Adams had to be hoisted into the plane, then arranged in a "neutral" position which was considered to be most convenient to permit him to control the airplane.

German investigators concluded that the unwieldiness of the inflated suit hampered freedom of movement to such an extent that a full-pressure suit would never amount to more than a makeshift arrangement for specific research purposes. This thinking was common up to and through World War II, as there were actually no aircraft being flown that had operational ceilings above the fringe of space. At the end of World War II, it was realized that planes could and would operate routinely above 50,000 feet—which to the biological scientist is the fringe of space.

The full-pressure concept — in which the entire body is contained in a pressurized envelope—is theoretically the ideal system of providing a livable atmosphere in an otherwise lethal environment. Full-pressure suits have been developed by the Air Force. These are physiologically sound but not completely satisfactory. More work is needed to resolve four main problems associated with such garments. These are heat, weight, bulk, and lack of mobility while pressurized. The latest USAF full-pressure suit is planned for operational use when aircraft require full protection for pilot and crew.



THE CAPSTAN PRINCIPLE

The capstans work in a five-to-one ratio. When five pounds per square inch are applied to the capstan, the body receives a pressure of one pound per square inch; so when 10 pounds per square inch are applied to the capstans, the airman has two pounds per square inch applied to his body.

Today's Suits

Current Air Force partial-pressure suits represent the end product of studies in pressure-breathing techniques dating back to the early 1930s. In 1943 an investigation at the University of Southern California resulted in the use of inflated tubes or capstans to provide mechanical counter-pressure. (See photographs of MC-4 suit for capstan locations and cross section drawing for principle of operation.) In 1945 when these studies were applied to the design of pressure suits, successful use of this emergency garment was made in simulated altitude chamber tests to 80,000 feet.

The partial-pressure suit is designed to be worn as an undergarment with ordinary flying clothing. It consists of a close-fitting, nonelastic nylon and cotton material which covers the entire body extending to the ankles, neck, and wrists. When inflated, the capstans, through the action of crossing tapes, tighten the fabric of the suit on the body. The size of the capstans is graded according to the portion of the body with which they are in contact.

Ratio of the tube to the body is five-to-one. Therefore, the pressure in the capstans must be five times the desired resultant pressure on the body. The objective is to supply the amount of positive pressure necessary to prevent "hypoxia" at a given altitude. (Hypoxia is a deficiency of oxygen available for the body tissues.) As man ascends to altitudes above 10,000 feet, the pressure of oxygen is reduced. Hypoxia is insidious in onset, and because it is lethal, makes it one of man's greatest dangers in altitude flying.

At 65,000 feet air density is only a fraction of that found at sea level, and supplemental oxygen is required. To keep from overinflating the lungs with this oxygen, it is necessary to supply a counter-pressure to the vest bladder that is integrated into the partial-pressure suit.

Several types of partial-pressure suits have been designed for the Air Force to meet specific mission requirements. The type T-1 suit was designed as a strictly emergency "get-me-down" suit which would protect the flyer for only six to eight minutes at an altitude of 65,000 feet. This means that the suit would provide protection at more compatible altitudes below 65,000 feet. Emergency descent from 65,000 feet—either by diving the aircraft or freefall after bailout—brings airmen to a lower altitude which is warmer and where oxygen is readily available. The USAF today has standard parachutes that will automatically open at a preset altitude of about 12,000 feet.

The T-1 suit has been tested in altitude chambers up to 106,000 feet and has been worn in extremely high-altitude experimental aircraft beginning with the initial flights of the Bell X-1.

An S-2 suit is identical to the T-1 except that the antigravity protection has been removed for comfort. This suit was used by USAF bomber crews whose aircraft did not undergo the high gravity stresses that are characteristic of highly maneuverable fighter aircraft.

USAF's MC-1 suit was designed to permit extended exposure at pressure-suit altitudes. This suit included a chest and abdominal breathing bladder to reduce the "work" of pressure breathing, smaller arm and shoulder capstans to increase comfort and mobility, pressurized gloves, and inflatable antipinch bladders under the capstans to reduce friction and prevent abrasion of the skin.

Current USAF partial-pressure suits are the MC-3 and MC-4. The difference between these is that the MC-4 contains an antigravity suit. The major improvement in these suits is the full-torso bladder which has eliminated strenuous pressure breathing.

But Do They Work?

How good are these garments? Time at pressure-suit altitude can now be measured in hours. A physiological training officer at Wright-Patterson AFB, Ohio, made a simulated altitude chamber flight to approximately 200,000 feet. The atmospheric pressure at that altitude is only .0046 pounds per square inch (sea level pressure is 14.7 pounds per square inch), so in reality these suits are protective in a vacuum.

The partial-pressure suit is the basic piece of equipment and can be only as effective as the capabilities of its accessories, i.e., helmet, gloves, boots, and oxygen regulator. The pressure helmet currently being used with the MC-3 and MC-4 partial-pressure suits is the MA-2. The MA-2 helmet consists of a thin rubber bladder which covers the entire head and seals at the neck by means of turning the bladder up to form a cuff. It is held in place by snaps on the suit. The neck seal is secured by the inflation of the torso bladder covering the shoulders, chest, and back. The helmet bladder is kept from ballooning by an outer covering consisting of

the same nylon and cotton fabric from which the suit is made. The helmet comes only in one size; therefore, this covering has lacings that are used to adjust to head size.

An electric grid is laminated into the facepiece to provide heat and prevent fogging or the formation of frost from the moisture in exhaled air and the reduced temperatures at altitude. The electricity is provided by the aircraft system and a rheostat is used to adjust the heat. When heat is used in this facepiece, visual distortion is terrific. A new helmet will eliminate this problem by removing the electric grid and by having a continual jet of dry breathing oxygen circulated over the facepiece. The communications components of the helmet are mounted on a sponge-covered bracket which permits individual adjustment.

Boots worn with this suit are the standard paratrooper boot modified with a rubber-covered steel pocket just above the ankle to allow space for the inflated capstan.

Gloves used are necessary to provide protection for the hands which at altitudes above 65,000 feet for prolonged periods will swell up to about the size of a grapefruit. These gloves are adjusted by lacings and have a bladder covering the back of the hand which is inflated simultaneously with the torso bladder. The gloves are either leather, nylon, or a combination of both.

Side view of the MC-4 suit. Note the capstan, size adjustment lacings, and the helmet tie-down attached to the hard outer helmet.

Back view of the MC-4 suit. Note helmet tie-down, capstans, sizing lacings, and special boots with capstan pockets just above and outside of the ankles. If the suit looks tight, remember it is worn as an undergarment.

New Regulator

The oxygen regulator used by these suits is a radical departure from its predecessors. The new regulator is located in a seat pan and is connected to the suit. The seat assembly provides a seat cushion in the aircraft and also contains survival equipment items. Prior to the use of this new arrangement, an aircraft-mounted oxygen regulator and an emergency regulator strapped to the airman were used. Now, one regulator in the seat assembly with emergency oxygen accomplishes the job. This regulator is completely automatic and provides the proper suit pressures required as altitudes increase or decrease. The only controls available to the flyer are the on-off valve and a press-to-test button for preflight checking of the partial-pressure suit assembly.

The United States Air Force is using this equipment today in the operation of its high-altitude aircraft. An Air Force flight surgeon used it on his memorable balloon flight to 102,000 feet. Test pilots have used it to safely combat the atmospheric conditions found in their flights through the lower fringes of space.

New changes are being developed in these suits by civilian manufacturers and Air Force research personnel. A full-pressure suit will be required for space travel. Man will have to take along his normal atmospheric environment, and the full-pressure suit or space cabins are the means now being perfected for this use.

Until a completely satisfactory full-pressure suit is capable of providing protection under present and future acceptability standards, the United States Air Force partial-pressure suit will continue to be used.

AIRMAN'S WORLD

TV HERO

Milt Caniff's Steve Canyon, popular hero of the syndicated comic strip of the same name, will visit American homes via television later this month.

Present plans call for the USAF lieutenant colonel to begin his new adventures on Saturday night, September 13, at 9:00 p.m. (EDT), immediately following the *Perry Como Show* on NBC television.

Actor Dean Fredericks has been selected to portray the handsome hero. Although Caniff will not author the scripts himself, he will stay close to the series as an advisor. The situations created for the half-hour filmed series will be different from those Caniff has used in his strip; however, the characters will be chosen from among the more than 100 that have appeared in the last 10 years.

USAF and the aircraft industry have been active in cooperating with the production of the new show.

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USAF SECRETARY SPEAKING

Secretary of the Air Force James H. Douglas has objected to what he terms a tendency to treat Air Force planes as aggressors in reports of near-miss incidents in the air.

"These reports," the Secretary said, "are often misleading in the implication that the Air Force plane involved is at fault simply because of its proximity to the civilian airliner.

"A case in point is the recent incident over Modesto, Calif. The American people read in their newspapers that 'the commercial airliner was forced to make a 500-foot dive when a B-52 jet bomber came within 200 to 300 yards of it' and that the 'airliner captain spotted the B-52 on a collision course at a distance of 3,000 feet and put his plane in a fast dive to avoid being hit.'

"I am not disputing the necessity for evasive action on the part of the airliner, but I do dispute the implication that the Air Force aircraft was in any way at fault. Let's look at the facts. The incident occurred in controlled airspace. The B-52 was taking off on an authorized CAA IFR (Instrument Flight Rules) clearance, climbing to an assigned altitude and under CAA control. The airliner was on VFR (Visual Flight Rules) clearance, responsible for his own clearance of other aircraft.

"Atmospheric conditions were clear and cockpit visibility unrestricted. The B-52's departure from Castle AFB was radar controlled from takeoff to cruising altitude and ground radar was directing the B-52 at the time of the incident. The B-52 was at its proper place in the departure plan and at the time of the incident was in a controlled area with a clearance to be at this point and altitude by Castle Radar Approach Control and Oakland CAA Air Route Traffic Control Center.

"I cite this incident to clearly indicate the B-52 position and its rigid conformance with all CAA rules and procedures. Unfortunately, I am sure this is not the impression received by people reading the account in the press based on the report of the commercial pilot. All near-miss reports are investigated very thoroughly by the Air Force. When we have found instances of violations, we have taken prompt and vigorous action.

"Until there is positive control in the separation of air traffic, we undoubtedly will continue to have near-miss reports. It should be emphasized that it takes two aircraft to constitute a near-miss and because an Air Force aircraft is involved it does not necessarily follow that it is responsible."

GLOWING REPORT

First USAF report providing an evaluation of the use of fluorescent paints in the prevention of aircraft accidents has been submitted by ATC's Flying Training Air Force. (See, *Gotta Glow On,* Airman's World, July '58 issue.)

FTAF officials have credited use of the paint with being a "major factor in the drastic reduction of mid-air collision accidents." Since January 1, 1958, the report cites the fact that there have been no "see and be seen" mid-air collisions at any USAF basic or primary flying school. This record has been maintained through more than 400,000 flying hours, in aircraft ranging from prop-driven through jet trainers.

At the same time it was pointed out that in addition to saving lives and reducing private property destruction, the paint will also provide a huge savings in equipment losses. All Training Command aircraft can be painted for less than one third the cost of a single trainer. Since mid-air collisions must involve a minimum of two aircraft, prevention of a single accident will result in a savings six times greater than the prevention cost in equipment alone.

Around the world every 15 days. That's the distance traveled by men of the 1861st AACS Flight (Facilities Checking) at Tachikawa AB, Japan. Only unit of its kind in the Far East, the men of the 1861st are charged with inspecting navigational aids for quality standard throughout Japan, Korea, Okinawa, and Iwo Jima to assure maximum safety for all flight crews. Here T/Sgt. Dulan Lyles, Jr., checks the angle of glide slope on final approach precision radar. Six aircraft are utilized to transport the 77 airmen, including 15 officers, who maintain constant surveillance over the equipment at more than 200 USAF bases.

A-MACE-ING

A new, improved version of the well known *Matador*, the Martin-built TM-76 *Mace*, is performing some amazing feats in local and crosscountry testing phases.

Utilizing launch sites at Holloman AFB, N. Mex., both A and B models have been fired and recovered locally and over the long-range facilities to Wendover AFB, Utah.

Different guidance systems are used in the two models, but they are interchangeable with only minor production changes.

An ATRAN guidance system has been installed in the TM-76A, while the B model utilizes a system based on inertial control.

ATRAN is a map-matching system developed by Goodyear Aircraft Corp. which permits extremely low flight altitudes while divorcing the *Mace* from need for ground control. It relates a film strip, actual or synthetic, to the terrain over which the missile will fly.

Since it does not depend on receiving electronic signals from the ground, it is almost impossible to jam or confuse the system, and the missile's flight must be traced, not just detected, before defensive steps may be taken. To further confuse radar tracking, the *Mace* can be programmed to vary its altitude during flight.

In specific tests below 1,000 feet, as many as six "jammers" have been used without confusing the ATRAN system.

An inertial guidance system has been installed in the TM-76B. Highly accurate, it permits the missile to be flown over any course, including wide expanses of water, without the necessity for terrain check points. It automatically compensates for changes in wind, temperature, and barometric pressures.

The inertial guidance system gives the *Mace* complete invulnerability to enemy jamming. Not only does it eliminate the need for ground-control facilities, but the system emits no radiation of any type, preventing enemy electronic detection.

The basic principle of the system is "memory-navigation." Geographic positions of both target and launch site must be known and fed into the missile before it is fired. Gyroscopically controlled, it automatically computes the necessary flight pattern according to the prefed information. The system was developed by AC Spark Plug Division of General Motors Corp.

A recovery system is being utilized during the testing phases thus affording repeated use of the test vehicles.

Both USAF and Martin Co. officials have expressed satisfaction with early test results.

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TOGETHERNESS

Master sergeants are automatically authorized concurrent dependent travel when assigned to any organization located at Albrook AFB, Canal Zone.

Other enlisted personnel who are entitled to have dependents accompany them on overseas assignments may also make advanced application for concurrent travel. However, this privilege is extended only when assignment is to CAirC units or tenant units located at Albrook. Applications should be directed to Commander, 5700th Air Base Group at that station.

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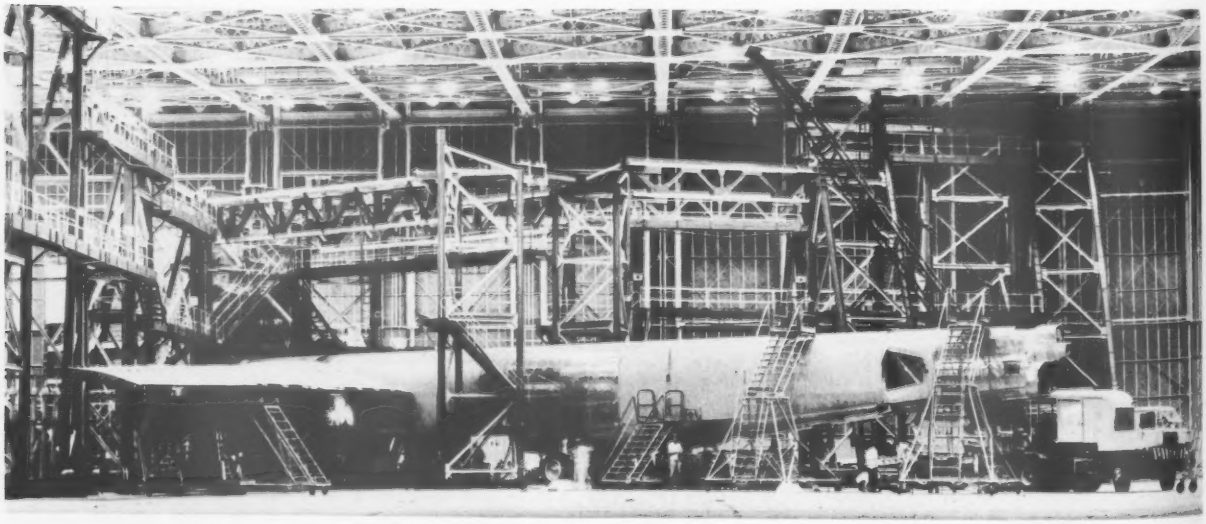
HIGHER LEARNING

Announcement of the names of more than 200 USAF colonels, selectees for attendance at seven major military colleges, is expected early this month.

Each of the seven colleges, including two of other nations, present courses of approximately 10-months duration, and most will convene late in 1959. One USAF member will attend the Canadian National Defence College in Ontario beginning in September, 1959. A single Air Force representative will also attend the Imperial Defence College in London convening in January, 1959.

Remaining courses will start in August, 1959. Thirty-four USAF representatives will attend the National War College, Fort Lesley J. McNair, Washington, D. C.; 40, the Industrial College of the Armed Forces, also at McNair; 10, the Naval War College, Newport, R. I.; and 10, the Army War College, Carlisle Barracks, Carlisle, Pa. An additional 122 names will be announced for attendance at the Air War College, Maxwell AFB, Ala.



Scientific destruction of a static test model Boeing B-52G, newest version of the sky giant, began in Boeing's Wichita, Kans., plant last month. Only engines, components which were not redesigned, instruments, wiring, and other accessories will escape the torture tests which are expected to last approximately nine months. The systematic destruction is designed to determine the limits of structural strength—information which cannot be obtained in normal flight testing.

Boeing Airplane Co. photo

FANGS ACROSS THE SEA→

Many airmen like to take a reminder of home with them when they are being transferred to an overseas assignment. A/2C Harlan Cooper of Waco, Tex., is no exception.

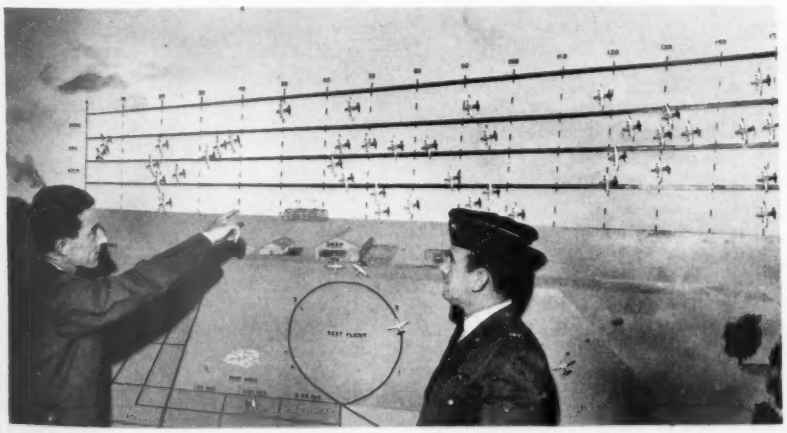
Depending upon your point of view, his selection may have left something to be desired, however. Prior to departing his Texas home, Cooper tromped off into the woods to hunt his traveling companions. To say that he was successful in his quest would be putting it mildly. Cooper's catch measured some seven-and-a-half-feet—in two sections. Three feet comprised a broadbanded copperhead, the balance a western diamond-back rattler.

He packed his pals in an overnight bag with some clothing and a shaving kit and headed for the APOE. In Cooper's words, "When I arrived in New York I went to the British Consulate, which gave me permission to take them to England with me and that was that."

Visions of the famous cartoon of a G. I. packing his favorite gal in a barracks bag must have danced in the head of Cooper's seat companion on the flight from McGuire AFB, N. J., to England. Cooper explained he (a colonel) "was a bit shaken when my bag moved a few times."

In reality, the story is not as bizarre as it may appear. The young Texas airman donated the snakes to the London Zoo after arriving in England. In return, he received an Indian cobra which he has since presented to the Zoological Society in his hometown.

After the exchange ceremonies, Mr. Reg Lanworn, overseer of reptiles at the London Zoo, invited Cooper to examine a python. As it curled fondly around his arm, the young Texan enthused, "I've always wanted to handle one of these."



An aircraft planning board that gives everything but the time of day at a single glance has appreciably reduced maintenance time at Evreux-Fauville AB, France. Designed by Capt. R. B. Orr, production analyst (left), the board is incorporated into a new maintenance control system which streamlines the entire engineering process of the 317th Troop Carrier Wing (Medium). According to Col. G. M. McNutley, Chief of Maintenance (right), the board discloses at a glance the status of each Lockheed C-130 *Hercules* assigned to the organization. Tiny magnetic models are placed on a metal mural of the base to indicate aircraft away on trips, AOCM or AOCP, stage of inspection, and test-flight status.

PRIMARY—BASIC—ADVANCED

First class in pilot photo-reconnaissance training in McDonnell's RF-101 *Voodoo* graduated recently from Tactical Air Command's advanced training school at Shaw AFB, S. C.

In addition to having the only advanced *Voodoo* school anywhere in the Air Force, Shaw has the only advanced flying school in any aircraft outside Air Training Command.

Students receive five observer and five pilot "rides" in the RF-101 simulator, 18-hours' preflight instruction, and 65-hours' transition training. The 12-week, five-phase course also includes fundamentals of aerial reconnaissance and aircraft engineering training.

Those participating in the first class were all recent graduates of the fighter-interceptor school at Moody AFB, Ga., and are presently in the process of being assigned to units in USAFE and PACAF.

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UNMENTIONABLES

Central Air Defense Force jet pilots will be the object of considerable attention this summer—and all because of their, if you'll pardon the expression, underwear.

CADF personnel are cooperating in tests to determine the feasibility of new lightweight thermal underwear, made of a combination of nylon and dacron.

In addition to being lighter and providing more freedom of movement for the crew member, they are expected to give protection against extreme low temperatures equal to the Arctic type presently in use.

Air-conditioned cockpits eliminate the need for protective clothing while flying; however, should bailout become a necessity at 35,000 feet, where temperatures reach 60 degrees below, such suits are mandatory for survival.

If the tests are successful, the new suit will be adopted commandwide in the near future.

★ ★ ★

AIR AGE LIBRARY

Baa Baa Black Sheep, "Pappy" Boyington, (G. P. Putnam's Sons, $4.50). An action-packed thriller of the truth-is-stranger-than fiction variety, this first-person narrative is a chronicle of a riches-to-rags-to-riches saga of one of the Nation's outstanding Marine Corps pilots of WW II.

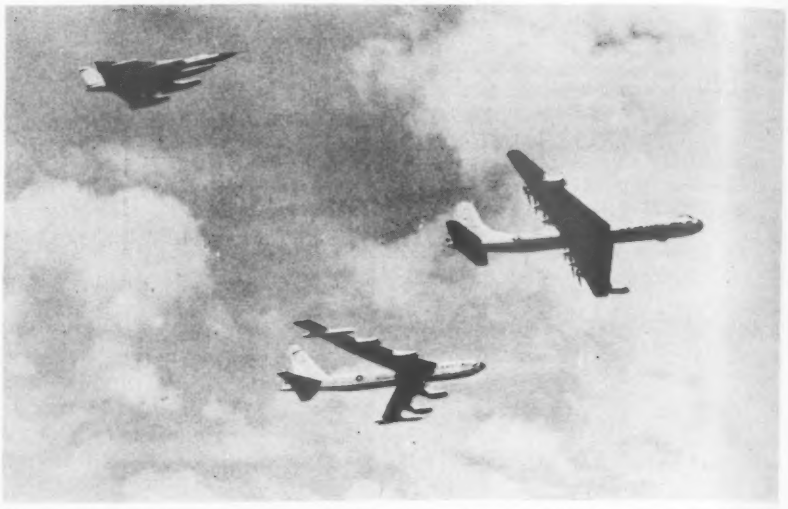
Men, Rockets and Space Rats, Lloyd Mallan, (Julian Messener, Inc., $5.95). A revised edition of the story of dedicated men who subject themselves to incredible tests and trials in learning to condition the body for the coming assault on the space frontier.

The Great Arms Race, Hanson W. Baldwin, (Frederick A. Praeger, Inc., $2.95). As military editor of *The New York Times,* Mr. Baldwin has often been called one of the country's foremost writers on military affairs. Here he examines and compares the world's two greatest arsenals, weapon by weapon.

Operation Grasshopper, Dario Politella, (The Robert P. Longo Co., $4.95). A gripping account of the role of the Army's light planes in the Korean conflict. Essentially a history, the book is loaded with anecdotes gathered by the author during his combat tour on the Korean peninsula.

Senior Master Sergeant **Chief Master Sergeant**

General Thomas D. White, USAF Chief of Staff, recently placed his stamp of approval on designs for E-8 and E-9 stripes. First promotions are expected this month.



Eleven years of insured peace—the life span of a great bomber that symbolized deterrent airpower but never dropped a bomb—passed in review in a few brief seconds at a recent Carswell AFB, Tex., commemoration ceremony. Brig. Gen. Nils Ohman, 19th Air Division commander and principal speaker at the brief rites, gave the farewell salute to the last Convair B-36 assigned to the base. The retiring SAC giant proudly led an aerial parade flanked by its successors, Boeing's B-52 *Stratofortress* and Convair's pod-bellied B-58 *Hustler*.

BITS OF BLUE

. . . The 335th Fighter Day Squadron, Elgin AFB, Fla., is conducting phase III testing on new Republic F-105 *Thunderchief* fighters. A total of 18 aircraft will be delivered for use in this testing program.

. . . Airmen will benefit from a recent $1,750,000 contract negotiated at MacDill AFB, Fla. The expenditure is earmarked for enlisted dormitory and dining hall facilities.

. . . Airmen facing proficiency testing in the 22 (photomapping) and 64 (supply) career fields can expect new tests late this year. The revised examinations are being prepared at Lackland AFB, Tex.

. . . The addition of pipeline transportation service at Mather and McClelland AFBs, Calif., has raised the total to 16 bases utilizing this method of fuel service. Estimated annual USAF savings are more than $3 million.

. . . USAF, SAC, and North American Aviation officials jointly announced selection of the popular name for the still secret B-70 bombers. Winner of the contest which drew more than 20,000 entries from within SAC was T/Sgt. Francis Seiler, March AFB, Calif. The official name—*Valkyrie.* In Norse mythology, legend places Valkyrie as a minion of Odin, Norse God of War, and describes her as a maiden of great beauty who ranged the skies on her steed in golden armor deciding the outcome of the battle.

. . . USAF bade goodbye to a famous name recently. Retired rolls were expanded with the addition of the name of M/Sgt. Joseph P. W. Arnold, brother of the late Gen. H. H. "Hap" Arnold, wartime chief of staff of the USAAF. Sergeant Arnold completed 20-years' active and National Guard service. His final three years were served as a member of the Colorado Air National Guard.

. . . Construction contracts for the *Bomarc* facility at Otis AFB, Mass., totalling nearly $10 million were recently awarded. No new property will be required since the facility will be located on land which is presently government-owned.

. . . The Army's Fort Bragg has made 527 housing units, existing and programmed, available to airmen at nearby Pope AFB, N. C.

. . . Two Regular Air Force officer promotion boards are presently in session in Washington, D. C. The first convened on August 11 to consider permanent promotions to major. The second began considering permanent promotions to the grade of captain on August 25.

Letters to the Editor

(Continued from page 1)

CONSECUTIVE TOURS

Sir: *In your article,* Personnel Report, *(June '58 issue) it says "Volunteers for consecutive overseas tours are handled by query direct to the overseas command requested. If a vacancy exists for a man with the qualifications of the requestor the transfer is arranged through Hq USAF and that name is stricken from the returnee list."*

It is my impression that consecutive tours have been stopped. Can you clear this up for me?

A/1C Richard Foster
APO 10, New York, N. Y.

Your impression is correct. At the time that the article was written, consecutive tours were still in effect. However, shortly afterwards the policy changed.

Officials in DCS/Personnel, Hq. USAF, indicate that a new, more limited consecutive overseas plan will go into effect as soon as details are coordinated.

* * *

WELL, AFRICA, ANYWAY

Sir: *I have been reading* THE AIRMAN *since last summer and I want to congratulate the staff on one of the most informative journals I have ever seen. However, a picture which you have captioned as Casablanca in the June issue, was taken from the* Cours de Lyauty *in Rabat. The Balima Hotel in the foreground is a dead giveaway.*

Lt. Albert Cox
Westover AFB, Mass.

Sir: *I have just finished reading your June issue and enjoyed it thoroughly, especially the article,* Nouasseur Comes of Age, *as I had been stationed at Rabat-Sale, just north of there. However, the photo of Casablanca is, in reality, Rabat. Who goofed?*

S/Sgt. George E. Coleman
Lowry AFB, Colo.

Sir: *In your June 1958 issue, on page 47, you have a scene of a city labeled Casablanca. I know better. I just returned from 16 months at Sidi Slimane. The city is Rabat.*

A/2C Eddie Aguilu
Pease AFB, N. H.

Sir: *I may be wrong, but the heading on the picture on page 47, upper right hand corner, leaves the impression that it is Casablanca. It's not. It's Rabat.*

A/1C Stowe
Francis E. Warren AFB, Wyo.

Sir: *The article was very well written and brought back many memories of my 31 months in Morocco, but the picture you have identified as Casablanca is Rabat.*

T/Sgt. Patrick McNabb
APO 953, San Francisco, Calif.

All of you and countless others are correct. The editor has established a course in geography for himself and staff. He also recommends it to the author.

* * *

NO ANSWER REQUIRED

Sir: *I am a civilian who considers herself fortunate to occasionally see a copy of* THE AIRMAN.

While most of the articles are written for members of a specialized service, I find them enjoyable, readable, and completely understandable. I should particularly like to cite the March-April issue article, The Wide New Yonder, *for technical coverage in layman language and* Toastmasters *in the May issue for clarity and reading ease.*

A taxpayer says thank you.

Mrs. H. L. Maynard
Washington, D. C.

* * *

SEARCH

Sir: *I came into possession of a copy of the attached poem in 1956. Allegedly it was written by a cadet at Spence AFB, Ga., who died in an aircraft accident shortly after writing it. He would probably have been stationed at Spence sometime in late 1953 or early 1954. Could you please publish it on the chance one of your readers might be aware of the author's name?*

Maj. Marion Barnhill, Sr.
Langley AFB, Va.

The poem to which Major Barnhill refers is printed on the inside back cover of this issue. How about it? Can anyone supply the author's name?

Shooting the Breeze

Out of Uniforms

During a clothing inspection, a new second lieutenant decided it would be easier for him to visit NCO's homes off-base than to have them bring in all their clothes. Armed with a list of names and addresses, he made his way about town, inspecting clothes with ease to himself and delight to the NCOs. Finally, he knocked on the door of the next to last address. A young man answered.

"Are your clothes in the bedroom?" he asked.

"Yes, they are," the man replied.

"Fine," said the lieutenant, "let's have a look at them."

Led into the house the officer followed the man into the bedroom where he was suddenly stopped by the gent's question of "What the —— is this?"

"The clothing inspection!" the lieutenant snapped. "Didn't you read the bulletin board?"

"No sir. What bulletin board?"

"Aren't you Sergeant Clark?"

"I've never been in the service in my life. I'm a medical student."

☆ ☆ ☆

Spell That S-A-C-K, Mam

While I was wearing the bush jacket during an off-base ceremony, I was approached by a lady.

"Son," she said, "I don't know what outfit you belong to, but you're sure in style with us girls. You've got the *sack* look, too!"

M/Sgt. Henry J. Lacour
Hamilton AFB, Calif.

☆ ☆ ☆

Fan Mail

A recent mail delivery to THE AIRMAN offices proved to be more than a little welcome. From a "personal" letter dropped a big bill and a two-line note.

"Saw your name in the masthead. Here's the money I borrowed 10 years ago. Guilty conscience."

If you know of any interesting anecdotes about USAF life, send them to us. The success of this column depends on you.

IT'S NOT THE HORSE...

but the hay that pulls the wagon.

WHILE duty hours in the military profession generally follow the pattern established by civilian society whenever possible, there are many thousands in Air Force blue who haven't put in a neat eight-to-five work day in years. Of all these nonconformists because of profession no individual observes a more bizarre operating schedule than the Air Force cook.

He creeps silently out of the barracks—sometimes with shoes in hand—at two, three, or four in the morning. His first cup of coffee for the day is probably swallowed scalding hot from a number 56 dipper while he copes with oceans of eggs or mountains of pancakes. And every evening, long after the line for the first movie has been swallowed up by the doors of the base theater, the rattle of pans and a rushing roar of running water can still be heard from behind the lighted windows of the kitchen.

In spite of an early reputation for affinity with Murphy's Laws and a heritage of bad jokes passed down from the halcyon days of war and reorganization, the Air Force food service program has undergone a process of orderly development until today it is characterized by a definite air of professionalism and efficiency.

Some little time ago, Maj. Walter R. Pienkowski, presently assigned as Chief, Food Services Division, Memphis Air Depot, Tenn., conceived the idea that food service personnel should be accorded public, official recognition for sustained outstanding performance. After a period of gestation and discussion, the idea led eventually to establishment of the Hennessy Trophy, to be awarded annually to the Air Force food service facility adjudged to be the best in the world. The competition for this significant distinction is sponsored by the Food Service Division of the Air Materiel Command in conjunction with the National Restaurant Association. This association is made up of leading members of the civilian business community from every state in the Union.

The trophy itself, as a symbol of professional excellence in the preparation and serving of food, takes its name from the late John L. Hennessy who served as special adviser to the President of the United States on military food service problems during World War II.

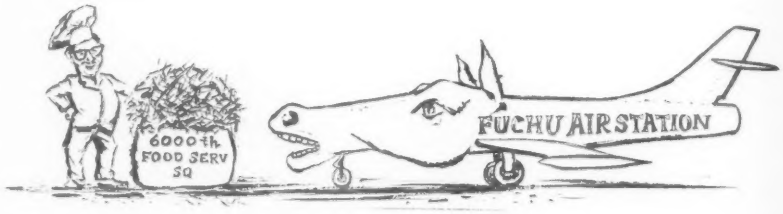
In 1957 the trophy was awarded for the first time, and in that year competition was conducted on a relatively modest scale. Some 300 installations were evaluated in the United States and overseas with Charleston AFB, S. C., earning the distinction of being first winner.

During 1958, however, more than 1,500 installations all over the world participated in the competition with interest mounting steadily in intensity throughout the period. While ground rules and a system of scoring are established by AMC, each major air command does its own judging based on a continuing evaluation of performance standards and giving due consideration to circumstances which may be peculiar to the area. Each command then submits its nomination for consideration.

Following the submission of nominees by the commands, an Air Force committee of military and civilian experts embarks on a worldwide tour of inspection, visiting each of the bases selected as "best" by the command supervisors. This committee, in turn, selects three outstanding installations as finalists and submits their nominations to a civilian-military team of judges.

From this final 1958 screening, Fuchu Air Station at Fuchu, Japan, emerged as the best place to eat in the entire Air Force, with Lincoln Air Force Base, Nebr., and Mitchel Air Force Base, N. Y., following in second and third places respectively.

Proud members of the 6000th Food Service Squadron at Fuchu were flown to Chicago for formal presentation of the award at the 39th Annual Convention of the National Restaurant Association. Maj. Gen. Charles L. Bondley, Jr., Director of Supply and Services, Headquarters USAF, accepted the handsome Hennessy Trophy on behalf of the Air Force and the 6000th Food Service Squadron. M/Sgt. Elba C. Carter, Food Service Supervisor at Fuchu—and probably the most exuberant individual among the 30,000 present for the convention—remarked with becoming modesty, "I am most proud to have been a part of the team that won."



The competition is over for another year, but Air Force food service personnel from Nome to Nouasseur are looking forward to 1959 which brings another opportunity to demonstrate their stature. There is no bitterness among the losers. Food service personnel are well aware of the important contribution they make day-in and day-out to the capability of American airpower. No one knows better than they: "It's not the horse but the hay that pulls the wagon."

Do What? Under What?

by M/Sgt. Paul J. Turner
Airman Staff

Drawings by Jack Lewis
GRAPHICS-AFCSS-PS-2

"And now, do you wish to elect or decline elections under the Uniformed Services Contingency Option Act?"

IN 17½ years of service no one had thrown a curve like that at this master sergeant.

The personal and family services officer who had called him in for an interview started to explain. "What I'd like to know, sergeant, is whether you've decided to take a reduction in your retired pay to provide an annuity under the Contingency Option Act?"

This was hitting below the belt. "Excuse me, sir," the sergeant replied, "but I've just about finished my 20 in this Air Force and I'm looking forward to $175 each month for the rest of my life. Why should I elect to take less?"

But the sergeant hadn't thoroughly read a copy of AFP 34-4-6 which accompanied a letter he received six months earlier telling him of the forthcoming deadline under which he would have to make this decision. So, the officer placed the AF Form 806 aside and started a thorough briefing.

The officer reached in his desk drawer and pulled out a worn copy of THE AIRMAN. On the cover was a picture of General Thomas D. White. "See this," he said. "It's the August '57 issue of THE AIRMAN." He quickly opened the magazine to page 9 and holding it out asked the sergeant, "Do you remember reading this?"

"Oh, yes sir," he replied, "that's all about the survivors' benefits law. As a matter of fact I think my wife's still got that copy at home."

The captain turned to page 16 and continued, "Here at the end, let me read you just a few lines . . . *But if he dies after retirement, not from service-incurred disabilities, his wife would receive nothing . . . However, in passing Public Law 239, the Uniformed Services Contingency Option Act (USCOA) in August 1953, Congress provided a method whereby retired personnel could establish an annuity for their widow and children by electing to receive a reduced amount of retired pay.*"

The sergeant started showing a new interest when the captain said ". . . wife would receive nothing . . ."

"This contingency option program is a special annuity plan and is not difficult to understand but unlike automatic survivors' benefits, you have to know enough about the plan to make a proper decision. The results of your decision won't be effective until you retire. I imagine THE AIRMAN could print a story like this on contingency options and still not answer all officers' and enlisted men's questions. I've often thought of asking them to consider it."

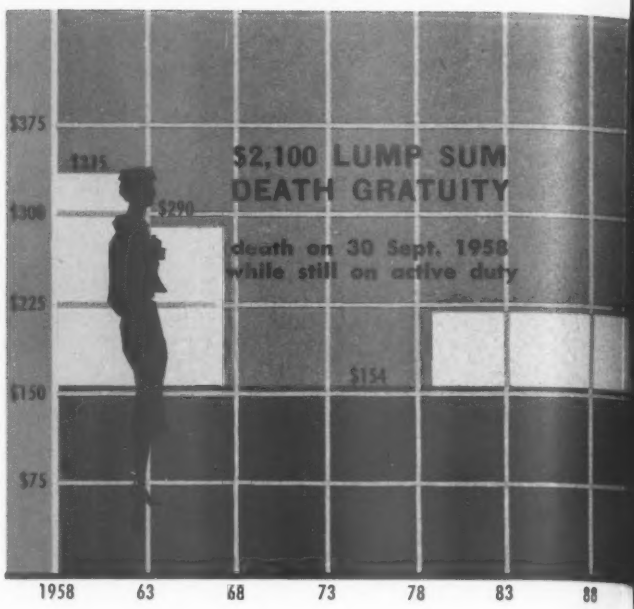
At Your Service

At the beginning of this year the Air Force had 30,373 persons on its retired list. During FY '58 some 4,879 airmen (officers and enlisted) retired. In FY '60 this will nearly double to an estimated 9,055 while FY '61 will see over 15,000 airmen seeking retirement. All those planning to retire must make a decision under the USCOA by their 18th year of service, which means at this very moment airmen are making such decisions on an average of one every 30 minutes around the clock. Future years will bring an even faster tempo to retirement and USCOA activity.

It is important then that all officers and enlisted men understand what USCOA is—how it affects their retire-

AN EXAMPLE OF SURVIVORS' MONTHLY INCOME

A Master Sergeant will have 20 years' service on 1 October 1958. He plans to retire then. He will be 44, his wife 41, and his children, 9 & 12.



Legend

Social Security
USCOA
Indemnity Compensation

ment, what decisions must be made and when, and all the implications of the program in order to render an intelligent decision on whether or not to participate. Not only are those coming close to retirement interested but each airman must know about USCOA since disability retirement can come at any time during a service career and USCOA provisions apply equally in such cases. For instance in FY '58 some 2,587 airmen were retired for disabilities while only 2,298 did so by virtue of length of service.

Non-disability retirees show four times as much participation in USCOA as do eligible disability retirees, who, even though they have less than 18 years' service, may elect to fall under the program even if they know they are on their death bed.

The Program

Congress enacted the Contingency Option Act in 1953 so that personnel of all the uniformed services might, by electing a reduced amount of retired pay (in essence an allotment), provide benefits for their surviving widows and/or children. A variety of options, both as to amount of benefit and beneficiaries designated, is available.

Eligible members may select a plan that will provide ½, ¼, or ⅛ of their reduced retired pay (the amount left after USCOA cost is deducted) as the monthly benefit provided. For example, let's assume that a master sergeant will be 55 years old when he completes 20 years' service and retires. He desires to provide an annuity of ½ his reduced retired pay for his wife, which will cost him approximately 14 percent of his retired pay or about $24.50. Deducting this from his $175 monthly retirement he receives $150.50 and, should he die, his widow would be paid $75.25 (½ the reduced amount) for the rest of her life or until she remarried. There is a wide variation in cost, influenced by such factors as age of retiree and beneficiaries, percentage of coverage desired, and option of payment selected. However, the cost is much lower than that for comparable commercial annuity or insurance plans since the Government defrays all administrative and overhead costs for the program.

How Much?

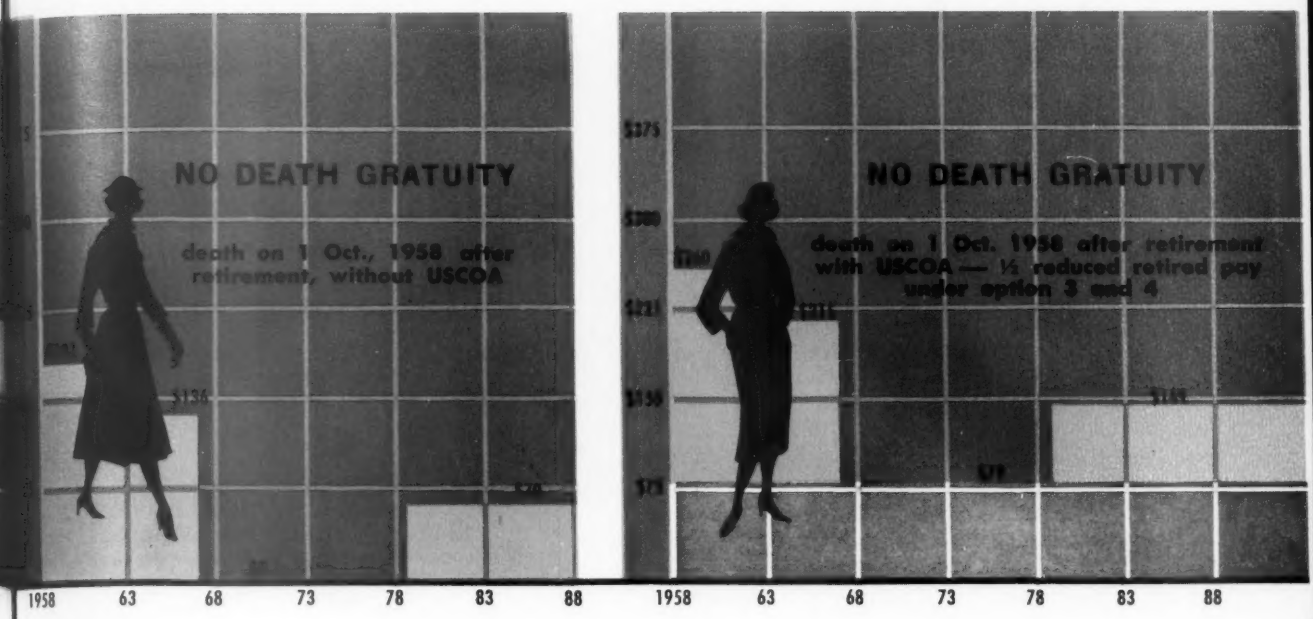
As stated previously the cost for the different amounts of coverage varies considerably. A Board of Actuaries monitors the program, establishes the rates for the different types of coverage, and reports on USCOA operation to the President. The mortality rate for disability retirees is higher than that for service retirees, thus they are charged *a higher rate*. Retiree's and beneficiaries' ages and amount of coverage affect all cost tables. In considering election to come under the program, airmen should decide how much income they want their family to have, what beneficiaries are to receive this amount, and then check with local personnel and finance officials on the actual monthly cost. AFP 34-4-6 gives tables on which approximate costs may be based.

Picking an Option

Under USCOA the annuity may be made to surviving wife and/or children under one of four options or plans.

Option 1. This provides monthly payments to a surviving wife for the remainder of her life or until she remarries. Those who would have no children under 18 at time of retirement would prefer this option. Some unmarried airmen who plan marriage before retirement would also consider this option.

Option 2. This election establishes monthly payments for children under 18 and is paid as long as there is an unmarried child under that age. In cases of mental and physical handicaps the 18-year-old cutoff does not apply.



Adopted children or stepchildren also qualify under this option. Airmen who will have such dependent children on the date they retire should consider option 2.

Option 3. The third plan is paid to the *family* of a retiree as long as there is an eligible person. Those who will have both a wife, and children under 18 at planned time of retirement would consider this type of coverage.

Bear in mind that the amount paid to beneficiaries each month doesn't change. It's the same as long as a qualified beneficiary survives. Under the above three options the amount taken out of the retiree's pay continues for his or her life—even if eligible beneficiaries become ineligible through age or death.

Option 4. For those who wish to protect against this permanent deduction Option 4 may be combined with any of the first three to provide that no further deductions be made after there is no longer an eligible beneficiary. Let's assume that a widowed member plans to retire when his youngest child is 12. Under Option 2, the deduction is made as long as he lives. If he elects Option 2-4, the reduction in retired pay would be effective for six years, or until the child reached age 18.

In addition to the "save-pay" Option 4, other combinations of options are possible to reduce the amount paid when children come of age and a wife still survives, or to cover similar contingencies. During the third year of USCOA operation most retirees preferred the combined plan which protects them from deductions after no beneficiaries exist. Naturally such "term" coverage costs a little more than lifetime deductions.

An example of how the cost compares for different types of options is shown in the following table, based on a master sergeant who plans to retire when he is 42, his wife is 39, and his youngest child is 10. An assumed retirement pay of $175 per month is used, with the sergeant selecting a plan to provide ½ his reduced retired pay.

OPTION	MONTHLY COST	MONTHLY BENEFIT
1 (Widow)	$15.08	$80.46
1-4 (Widow)	16.06	79.97
2 (Children)	.70	87.65
2-4 (Children)	1.12	87.44
3 (Family)	15.00	80.00
3-4 (Family)	16.05	79.47

In Uniform

Uniformed services covered by this act include not only the military but members of the Coast Guard, Coast and Geodetic Survey, and Public Health Service. Members of any of these services become eligible for participation upon retirement. Retirement can, of course, be by virtue of length of service or disability. Those retired for disabilities with less than 18 years' service can make the decision at time of retirement. Decisions by other members on whether or not they wish to take a reduction in retired pay and provide for beneficiaries under one of the options, must be made prior to completion of 18 years' service.

At the time an airman completes 17 years' service, unit commanders are responsible to see that a letter or memorandum is sent to him, advising of the deadline before which he must make a decision about USCOA. The airman acknowledges this letter by indorsement. A copy of AFP 34-4-6 is also furnished the airman at this time. At least six months before the deadline (17½ years' service) the airman must be interviewed with follow-up interviews between 30 and 90 days before the deadline

date. Every airman must elect an option or options or decline election on AF Form 806 by the 18-years' service deadline date.

An airman may modify the terms of his election (by increasing or decreasing the amount or the option selected) as often as he likes, before he retires. Such modifications are effective five years after the date of execution. If the member retires before the five years are up the current election still holds. By the same token a member can revoke a previous election but again it will not be effective for five years and if he retires in the meantime the revocation has no effect. If a revocation becomes effective by virtue of five more years active duty, the airman is no longer eligible for any coverage under the act.

Dependents acquired after retirement are not eligible under USCOA. Notification of a change of beneficiaries is not a modification of election. Each member names his beneficiaries (if any) at the time of election and makes changes thereafter as soon as they occur. (A single airman may make an election for a wife and/or children in contemplation of marriage. If he has no beneficiaries when he retires he doesn't participate.)

Should anyone who has elected to use USCOA and has been retired, enter a period during which he is not receiving retired pay, i.e. by virtue of being called to active duty or as a result of a waiver to accept VA benefits, etc., he is required to make monthly payments on his USCOA annuity until such time as he reenters retired-pay status. In the case of those on the temporary disability retired list who are later returned to active duty, a refund is made of any USCOA deductions minus the amount that term insurance for equal coverage over the retired period would have cost.

Of the larger uniformed services, the Air Force had the greatest USCOA participation rate during the third year of operation. The decision as to whether or not you want to reduce your retired pay in order to provide an annuity for your survivors when you die, is an important and difficult one. It is beset by many variables.

First, the new survivors' benefits legislation provided Social Security coverage for your dependents. You may have personal insurance. Your ability to work and supplement your retirement income will influence your decision on whether you can afford to reduce your retirement pay. The ages of your children at time of retirement must be considered. Each individual case requires individual study and base personnel, legal, and finance officers should be consulted for advice concerning their respective fields.

Cues of Caution

Airmen who have already indicated that they wish to participate under USCOA are required by AFR 34-15 to screen their USCOA data at least every year to make sure that beneficiaries are current, that options are still valid to meet anticipated needs, etc. Those who make elections in the future should also periodically review their elections during the interim between election and actual retirement.

It is also well to remember that USCOA rates can be increased or decreased and you must pay the rate in effect at time of your retirement. Also, present rates when applied to the recent pay increase will mean larger deductions from those who have elected and have not yet retired, but, by the same token the monthly payments provided will also be greater. If the rates change after you retire there is no change in either your payments or the amount your beneficiaries would receive.

There is no connection between USCOA and Government insurance, consequently a retiree can have both in effect. It is well to remember though that those who plan to join USCOA and carry large amounts of insurance in force for the protection of their family after retirement, are in effect, being doubly insured. The payments for such protection are often more than a retiree can make.

Change May Come

In its latest annual report to the President the USCOA Board of Actuaries suggested a plan whereby no election would be effective if an individual retires before the completion of 20 years' service. It also advocates a five-year

advance election before any effective date. This would mean a 20-year airman would have to elect at 15 years to have USCOA coverage in force when he retired. One advantage from such a plan is it would permit use of a single cost table for both disability and non-disability retirees. Other minor changes have also been suggested.

The USCOA, altered little since its passage in 1953, continues to provide a means whereby servicemen can provide an annuity for their survivors in an insurance-type plan after retirement. How much the act will be changed in the future would be speculation, but the desire is to make it more flexible and attractive. However, thorough understanding of the existing program is mandatory for those who are approaching 17 years of service.

Officers and enlisted men wishing to further study the act and its importance to their own retirement plans should consult with local base offices and also avail themselves of AFP 34-4-6, AFP 34-4-3, AFBul 16 (1953), AFBul 24 (1953), and AFBul 3 (1956). A new Air Force pamphlet will be in production soon, containing answers to commonly asked questions about USCOA.

Last Formation

I'd like to have a moment, Sir,
Up here so close to You,
To talk about the things I've done
And things I've yet to do.

At times I've left formation,
To peel off and slip away,
When "Move in. Close that gap up."
Was the order of the day.

I didn't need my compass.
No, not me. I thought I knew.
So I've cursed and made excuses
When my field was overdue.

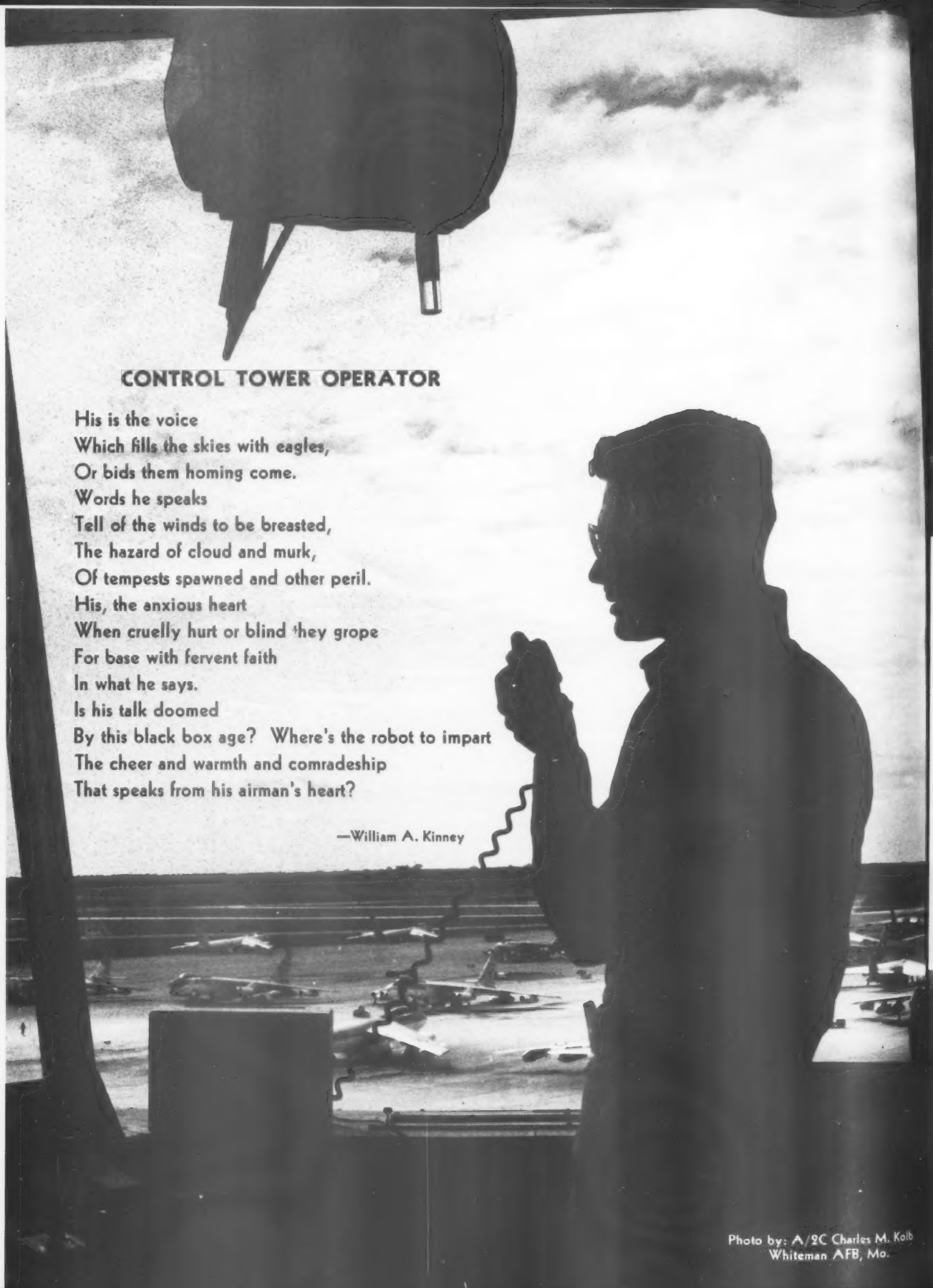
But each time I've lost my way, Sir,
From my flight of fellow men,
You've found and brought me safely
To formation once again.

And I know that You are watching, Sir,
As I walk Your halls of air,
For the majesty of Heaven
Is about me everywhere.

And when You form Your squadron, Sir,
And lead those men who fly
On their last and final mission
To Your airdrome in the sky,

I ask that I may be there Sir
To make that journey too.
With throttles to the firewall,
Sir, let me follow You!

(See Letters to the Editor, page 43)



CONTROL TOWER OPERATOR

His is the voice
Which fills the skies with eagles,
Or bids them homing come.
Words he speaks
Tell of the winds to be breasted,
The hazard of cloud and murk,
Of tempests spawned and other peril.
His, the anxious heart
When cruelly hurt or blind they grope
For base with fervent faith
In what he says.
Is his talk doomed
By this black box age? Where's the robot to impart
The cheer and warmth and comradeship
That speaks from his airman's heart?

—William A. Kinney

Photo by: A/2C Charles M. Kolb
Whiteman AFB, Mo.

. Kolb